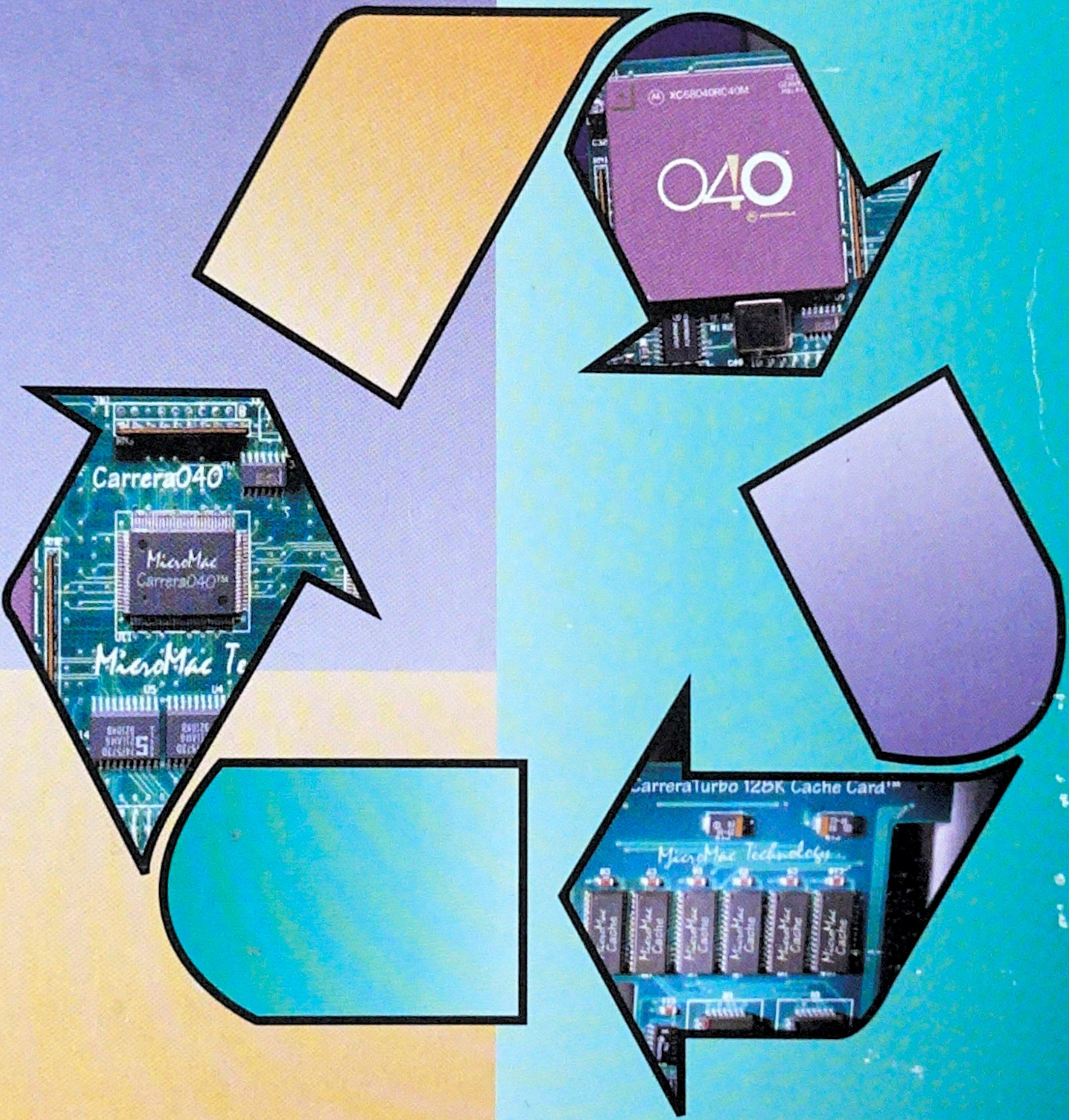
INSTALLATION MANUAL

MicroMac Technology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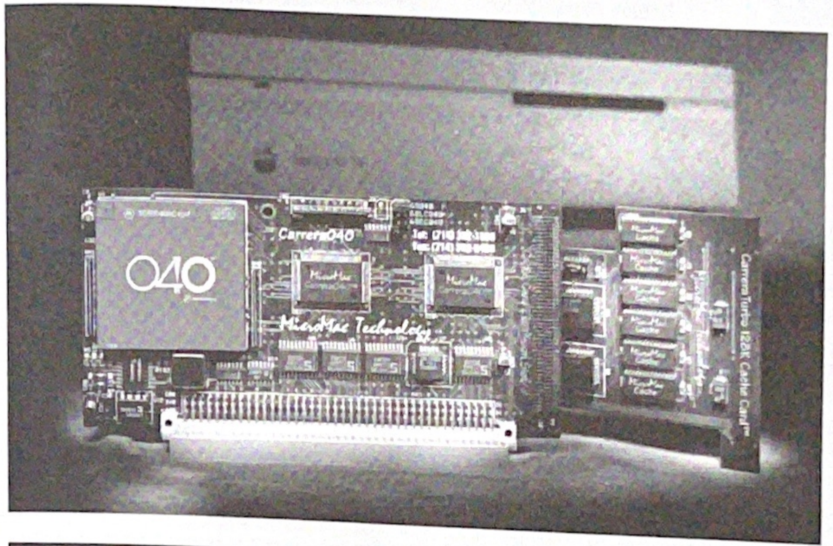
CarreraTurbo 128K Cache Card

MicroMac Technology

Installation Manual

for the MicroMac Carrera040 Accelerator

version 1.1


Carrera040
040
MicroMac Technology
CarreraTurbo 128K Cache Card

The MicroMac Carrera040 Accelerator & CarreraTurbo 128K Cache Card
for the Macintosh IIci, IIsi, IIcx & IIx

MicroMac Technology

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MicroMac Carrera040 Accelerator

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MicroMac Technology

Dear Valued Customer,

Congratulations and thank you for purchasing the MicroMac Carrera040 accelerator. Our aim with this product, just like with the other upgrade products from MicroMac Technology, is to help you to protect and leverage the investment that you already have made in your Macintosh computer.

We have paid attention to the little details and used only quality parts throughout so you can get years of service and enjoyment with only a small investment in assembly time. We hope it will make your future Macintosh experience even more enjoyable.

In this business, if you are not constantly improving you are falling behind. We are always looking for new ideas and approaches. If you have feedback, ideas or suggestions about the MicroMac Carrera040 accelerator or this manual, please feel free to contact us.

Sincerely,

Achim Strupat

Achim Strupat
President

If you are familiar with Macintosh hardware, here is a summary of the installation of your Carrera040 acceleration in your Macintosh:

1. **Open your Macintosh**
   Open your Macintosh by removing the case cover to gain access to the logic board.

2. **Install the CarreraTurbo 128K Cache Card**
   If you purchased the CarreraTurbo 128K Cache card, install it onto the Carrera040 accelerator at this time.

3. **Install the Carrera040 Accelerator**
   For the IIci insert the Carrera040 accelerator into the PDS slot. For the IIsi, first insert the Carrera040 accelerator into the IIsi adapter and then insert the IIsi adapter into the PDS slot. For the IIcx and IIx, remove the logic board, mount the adapter, re-install the logic board and mount the Carrera040 accelerator onto the adapter board. If you have an 80MHz Carrera040 accelerator with heatsink fan, install it as well.

4. **Close your Macintosh**
   Replace the case cover onto your Macintosh.

5. **Install the Software**
   Boot your Mac and insert the Carrera040 Start-up disk. Locate the Carrera040 Control Panel on the Start-up disk and copy it into the the Control Panels folder (located inside your System folder) on the hard disk. For the IIci and IIsi, select 32-Bit Addressing from the Memory Control Panel. If you have a IIcx or IIx, you will need to first install Connectix's Mode32 located on the Carrera040 Utilities disk in order to achieve a 32-bit clean ROM. If you are running System 7.0–7.1, install Mode32. If you are running System 7.5, install Mode32 designated for System 7.5. After you have installed Mode32, select 32-Bit Addressing from the Memory Control Panel.

6. **Enjoy your increased Speed**
   Restart your Macintosh and enjoy the increased speed of a 66MHz or 80MHz 68040 processor.

Introduction

This installation manual covers the installation and operation of the MicroMac Carrera040 accelerator with optional CarreraTurbo 128K Cache card. With the Carrera040 accelerator, you will be able to enjoy Quadra-level performance on your Macintosh IIci, IIsi, IIcx and IIx. The Carrera040's innovative design is based on several technical advances which enhances compatibility and increases reliability. The universal architecture of the Carrera040 accelerator supports 66MHz and 80MHz 68040 processors with or without an FPU and/or CarreraTurbo 128K Cache card. Add it all up and you will find the MicroMac Carrera040 accelerator is a terrific value that will help keep you and your Macintosh productive for years to come.

Using this Manual

This installation manual contains instructions on:

- Installing the Carrera040 accelerator (with or without the optional CarreraTurbo 128K Cache card) in a Macintosh IIci, IIsi, IIcx and IIx
- Using the Carrera040 Control Panel
- Compatibility and troubleshooting issues

Inventory

As you unpack your new MicroMac Carrera040 accelerator, please take the time to check that you have received the following items:

- MicroMac 66MHz Carrera040 accelerator

or

- MicroMac 80MHz Carrera040 accelerator (with attached heatsink fan)
- Carrera040 adapter (IIsi, IIcx & IIx only)
- Carrera040 Start-up disk
- Utilities disk
- This manual

- CarreraTurbo 128K Cache card (if purchased)

Before you Begin

We ask that you save the original packing materials and box. The original packing materials provide the best protection for your MicroMac Carrera040 accelerator should the need arise to store or ship it again.

Installing your MicroMac Carrera040 accelerator in your Macintosh can be accomplished by following the steps in the following chapter. As you go through this manual, please read each paragraph in its entirety before actually completing the instructions. The area and tools you will need to install your MicroMac Carrera040 accelerator are:

- A flat, non-conductive static-free work area
- A philips screwdriver
- A large flat-blade screwdriver
- A firm sponge pad (see your packing materials)

If you are installing the Carrera040 into a Macintosh IIsi IIcx or IIx, you will also need to install the necessary adapter that came with your Carrera040 accelerator.

Note: We strongly recommend making a back-up of the MicroMac Carrera040 Start-up disk before installing any hardware and software. You should always use this duplicate whenever the MicroMac Carrera040 Start-up disk is mentioned in the manual.

Please also read any "READ ME" files on the disks for latest updates concerning your Carrera040 accelerator.

System Software Requirements

System software requirements:

- System 7.0 or greater
  (If you choose to use System 7.0 or 7.0.1 you must use Tune-up 1.1 on your System 7 software.)
- Mode32 or Mode32 for System 7.5
  (for IIcx and IIx only)

Macintosh IIci Installation

The Macintosh IIci has a total of four expansion slots–three NuBus slots and one Processor Direct Slot (PDS). The Carrera040 accelerator mounts directly into the PDS slot of the Macintosh IIci.

Installation takes approximately 10 minutes.

To install the Carrera040 accelerator, please follow these steps:

1. Shut down the computer and disconnect the power cord. If the computer has been on, the metal power-supply case inside the computer may be very hot. Please wait at least five minutes until it cools before you begin the installation.

2. Turn off all peripheral devices, including any external monitors.

   During installation, you will need to move the main unit of the computer. You may want to disconnect the peripheral cables from the back of the computer, including the mouse and keyboard.

3. Locate the security screw as shown in Figure 3A-1 and use a philips screwdriver to remove the security screw on the back of the computer case cover.

4. Press and release the two lid latches as shown in Figure 3A-1 and lift the case cover off.

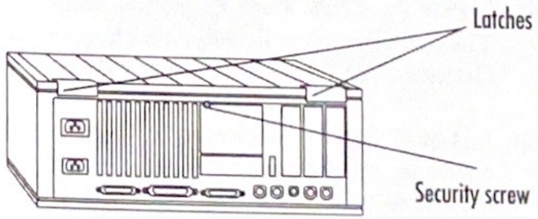

Figure 3-A1: *Location of security screws and latches*

5. Locate the PDS slot on the logic board as shown in Figure 3A-2. It is a 120-pin, black socket located next to the power supply. If an Apple or third party cache card is installed, please remove it.

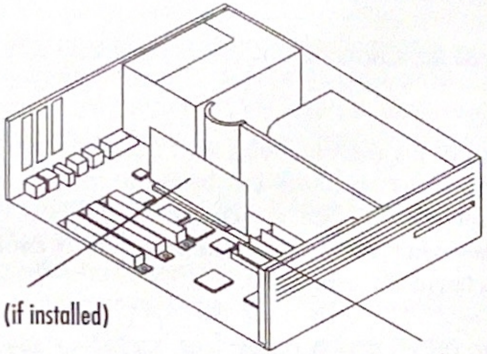

Figure 3A-2:
Location of PDS slot

6. Remove the Carrera040 accelerator from its anti-static shipping bag.

7. If you are not installing the optional CarreraTurbo 128K Cache card, continue to follow the instructions at step 9.

CarreraTurbo 128K Cache Card Installation

8. Please follow these steps in order to install the CarreraTurbo 128K Cache card onto the Carrera040 accelerator.

    8a. Remove the Cache card from its anti-static shipping bag.

    8b. Locate the Cache Card Expansion Slot connector. The connector is located on the edge of the Carrera040 accelerator, opposite of the '040 CPU.

    8c. Install the Cache card onto the Expansion Slot connector by aligning the Cache card directly over the connector as shown in Figure 3A-3. Plug the Cache card into the connector until it is completely seated.

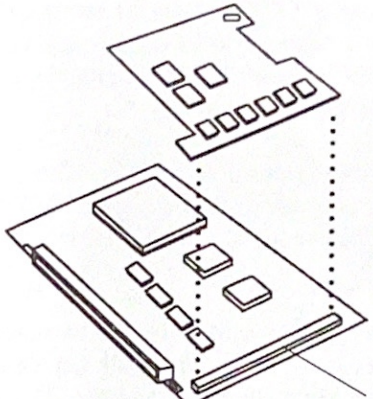

Figure 3A-3:
Installing the CarreraTurbo 128K Cache card onto the Carrera040 accelerator

Carrera040 Accelerator Installation

9. Carefully insert the Carrera040 accelerator into the Macintosh IIci PDS slot as shown in Figure 3A-4. Align the 120-pin connector on the bottom of the Carrera040 accelerator directly over the PDS. The large '040 CPU should be facing the metal power supply case. Push down firmly on the top edge of the card until the connector is completely seated. **Do not** use major force or wiggle the accelerator from side to side. If the Carrera040 accelerator does not go in easily, pull it out and realign it again with the connector.

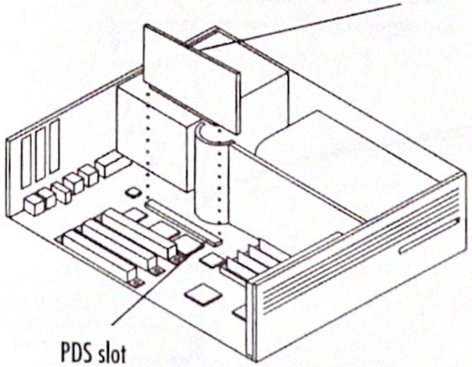

Figure 3A-4:
Installing the Carrera040 accelerator into the Macintosh IIci

10. If you installed a 66MHz Carrera040 accelerator, continue to follow the instructions at step 12. If you installed an 80MHz Carrera040 accelerator, continue to follow the instructions at step 11.

Heatsink Fan Installation

11. Please follow these steps in order to install the heatsink fan that came attached with your 80MHz Carrera040 accelerator. Please refer to Figure 3A-5 as you follow each step.

    11a. Locate the power cable with the two connectors on it that came with your heatsink fan. One should be female white connector and the other a white male connector.

    11b. Locate the cable that is connected to the back of your Mac's internal hard disk drive and disconnect it.

    11c. Install the female white connector on the power cable to the back of the hard disk drive and the male white connector to the cable that was originally plugged into the hard disk drive.

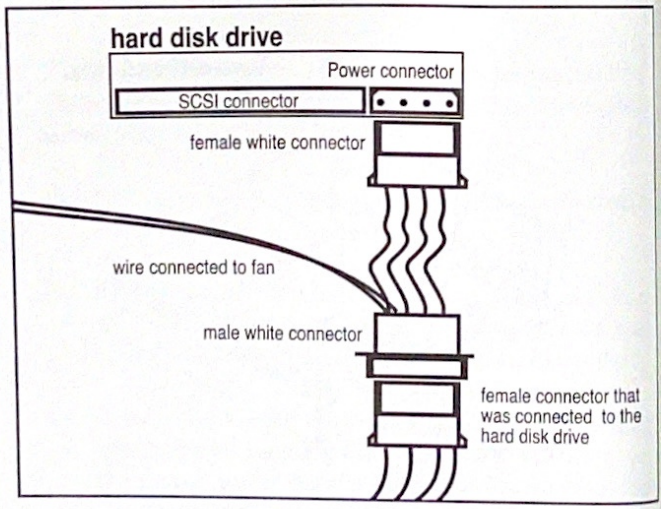
hard disk drive
Power connector
SCSI connector
female white connector
wire connected to fan
male white connector
female connector that was connected to the hard disk drive

Figure 3A-5:
Installing the heatsink fan

12. Replace the case cover back on the computer. Press the cover down until the latches snap into place. Replace and tighten the security screw.

13. Congratulations! You have now completed the hardware installation of the Carrera040 accelerator. You are now ready to install the Carrera040 software. Please refer to Chapter 4, "Software Installation" to install the necessary software for your Carrera040 accelerator.

Macintosh IIsi Installation

The Macintosh IIsi has one Processor Direct Slot (PDS). To install any expansion card in your IIsi (accelerator, video, Ethernet, etc.) you need either a NuBus adapter or a PDS adapter. The Carrera040 is shipped with the PDS adapter.

If You Have a PDS Adapter

The MicroMac IIsi PDS adapter allows you to install two cards in your computer, a Carrera040 accelerator and a third party PDS card. If you currently have a PDS card installed in your computer, you should be able to plug it into the MicroMac PDS adapter along with the Carrera040 accelerator. If possible, we recommend that you first install the Carrera040 accelerator and test it before installing your PDS card. However, you can only do this if your monitor is connected to the built-in video of your IIsi and not a third party PDS video card.

If You Have a NuBus Adapter

If you have a NuBus adapter installed in the PDS but are not using it, remove the NuBus adapter and use the supplied PDS adapter that came with your Carrera040 accelerator. If you are currently using a NuBus adapter and need to use it with your Macintosh IIsi, you will need to ship the NuBus adapter to MicroMac Technology. For a nominal fee MicroMac will combine your NuBus adapter with a special MicroMac adapter connector to give you both a PDS slot and NuBus slot. This will allow you to use both the Carrera040 accelerator and your NuBus card. When you receive back your modified NuBus adapter, please follow the instructions as if it was the PDS adapter.

For the NuBus conversion, call MicroMac Technology at (714) 362-1000 to obtain current pricing information and an RMA number. Once you receive an RMA number, carefully package the NuBus adapter, write the RMA number on the outside of the package and send it to the the address mentioned at the beginning of this manual.

Please remember to write the RMA number on the outside of the package.

Installation takes approximately 15 minutes.

To install the Carrera040 accelerator, please follow these steps:

1. Shut down the computer and disconnect the power cord. If the computer has been on, the metal power-supply case inside the computer may be very hot. Please wait at least five minutes until it cools before you begin the installation.

2. Turn off all peripheral devices, including any external monitors.

   During installation, you will need to move the main unit of the computer. You may want to disconnect the peripheral cables from the back of the computer, including the mouse and keyboard.

3. Locate the security screw as shown in Figure 3B-1 and use a philips screwdriver to remove the security screw on the back of the computer case cover.

4. Press and release the two lid latches as shown in Figure 3B-1 and lift the case cover off.

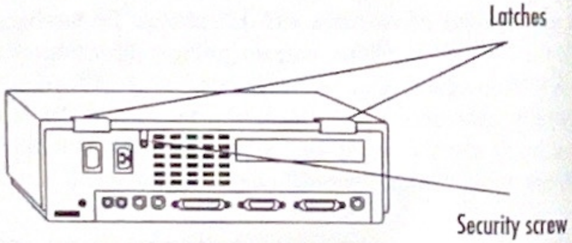

Figure 3B-1:
Location of security screw and latches

5. Locate the PDS slot on the logic board as shown in Figure 3B-2. It is a 120-pin, white socket located near the SIMM sockets.

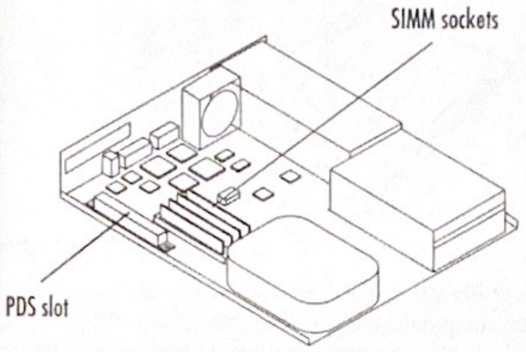

Figure 3B-2:
Location of PDS slot

6. Remove the Carrera040 accelerator from its anti-static shipping bag.

7. If you are not installing the optional CarreraTurbo 128K Cache card, continue to follow the instructions at step 9.

CarreraTurbo 128K Cache Card Installation

8. Please follow these steps in order to install the CarreraTurbo 128K Cache card onto the Carrera040 accelerator:

   8a. Remove the Cache card from its anti-static shipping bag.

   8b. Locate the Cache Card Expansion Slot connector. The connector is located on the edge of the Carrera040 accelerator, opposite of the '040 CPU.

   8c. Install the Cache card onto the Expansion Slot connector by aligning the Cache card directly over the connector as shown in Figure 3B-3. Plug the Cache card onto the connector until it is completely seated.

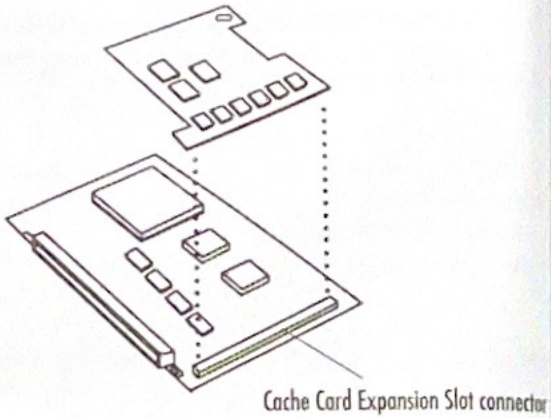

Figure 3B-3:
Installing the CarreraTurbo 128K Cache card onto the Carrera040 accelerator

9. Carefully insert the Carrera040 accelerator into the IIs PDS adapter as shown in Figure 3B-4. Align the 120-pin connector on the bottom of the card directly ove the center connector on the adapter. Push down firmly on the top edge of the card until the connector i completely seated. The 120-pin connector is "keyed" so that it can only be installed in one direction in th second slot.

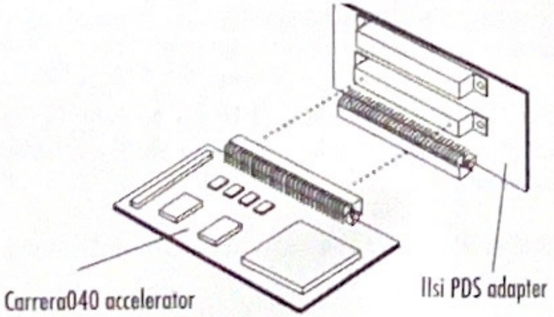

Figure 3B-4:
Installing the Carrera040 accelerator into the IIsi adapter

Carrera040 Accelerator Installation

10. Carefully insert the IIsi PDS adapter with th Carrera040 accelerator into the Macintosh IIsi PDS slo as shown in Figure 3B-5. Align the 120-pin connecto on the bottom of the adapter directly over the PDS slot. Push down firmly on the top edge of the adapter unti the connector is completely seated. The connector i "keyed" so that it can only be installed in one direction. **Do not** use excessive force or wiggle the adapter from side to side. If the adapter does not go in easily, pull out and realign it over the connector.

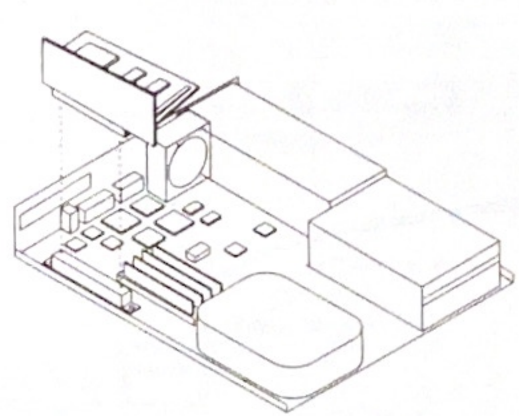

Figure 3B-5:
Installing the IIsi adapter with the Carrera040 accelerator into the Macintosh IIsi

11. If you installed a 66MHz Carrera040 accelerator, continue to follow the instructions at step 13. If you installed an 80MHz Carrera040 accelerator, continue to follow the instructions at step 12.

Heatsink Fan Installation

12. Please follow these steps in order to install the heatsink fan that came attached with your 80MHz Carrera040 accelerator. Please refer to Figure 3B-6 as you follow each step.

12a. Locate the power cable with the two connectors on it that came with your heatsink fan. One should be a female white connectors and the other a male white connector.

12b. Locate the cable that is connected to the back of your Mac's internal hard disk drive and disconnect it.

12c. Install the female white connector on the power cable to the back of the hard disk drive and the male white connector to the the cable that was originally plugged into the hard disk drive.

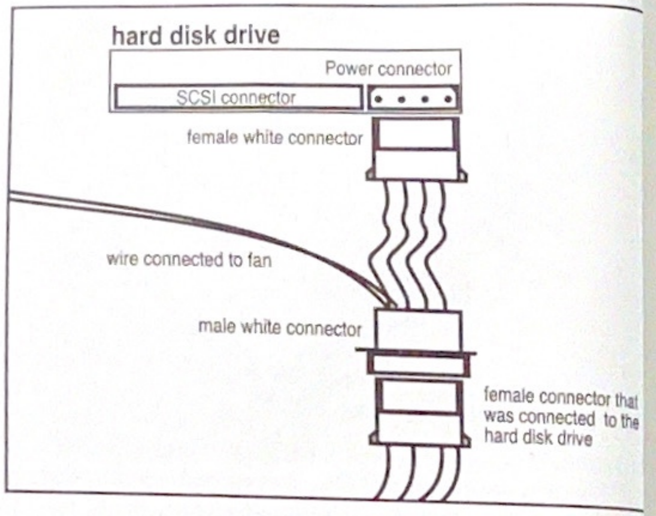
hard disk drive
Power connector
SCSI connector
female white connector
wire connected to fan
male white connector
female connector that was connected to the hard disk drive

Figure 3B-6:
Installing the heatsink fan

13. Replace the case cover back on the computer. Press th cover down until the latches snap into place. Replac and tighten the security screw.

14. Congratulations! You have now completed th hardware installation of the Carrera040 accelerato You are now ready to install the Carrera040 softwar Please refer to Chapter 4, "Software Installation" t install the necessary software for your Carrera04 accelerator. If you have a PDS card you plan to insta in addition to the Carrera040 accelerator, pleas proceed to step 15 ***after*** installing the Carrera04 software.

Note: We strongly recommend, if possible, that you fir boot your Mac with just the Carrera040 installed (this ma not be possible if you cannot plug your monitor directl into the built-in video of your Mac IIsi). This will greatl simplify the installation process.

Installing the PDS Card

15. Remove the IIsi PDS adapter from the PDS slot an carefully insert the PDS card into the adapter as show in Figure 3B-7. After the PDS card is firmly installe into the PDS adapter, Align the 120-pin connector o the bottom of the adapter directly over the PDS slo Push down firmly on the top edge of the adapter unti

the connector is completely seated. The connector is "keyed" so that it can only be installed in one direction. **Do not** use excessive force or wiggle the adapter from side to side. If the adapter does not go in easily, pull it out and realign it over the connector.

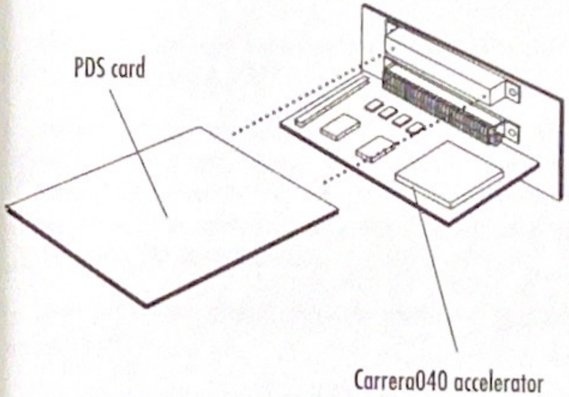
PDS card
Carrera040 accelerator

Figure 3B-7:
Installing a PDS card into the IIsi adapter

Macintosh IIcx Installation

Installation for the Macintosh IIcx involves removing the logic board, identifying the 68030 CPU type, plugging the IIcx adapter into the CPU socket on the logic board and plugging the Carrera040 accelerator into the adapter. If the 68030 CPU is soldered, the logic board needs to be shipped to MicroMac Technology. For a nominal fee, MicroMac Technology will install a socket for the 68030 CPU.

Logic Board Removal

Please follow steps 1-6 to locate and remove the IIcx logic board and identify the CPU type:

1. Shut down the computer and disconnect the power cord. If the computer has been on, the metal power-supply case inside the computer may be very hot. Please wait at least five minutes until it cools before you begin the installation.
2. Turn off all peripheral devices, including any external monitors.

   During installation, you will need to move the main unit of the computer. You may want to disconnect the peripheral cables from the back of the computer, including the mouse and keyboard.
3. Locate the security screw as shown in Figure 3C-1 and use a philips screwdriver to remove the security screw on the back of the computer case cover.
4. Press and release the two lid latches as shown in Figure 3C-1 and lift the case cover off.

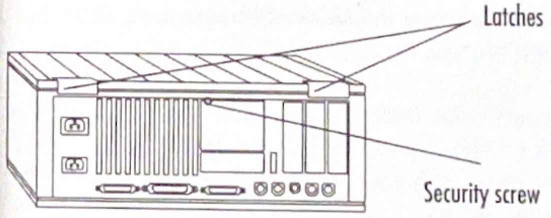

Figure 3C-1: *Location of security screw and latches*

5. Locate the power supply; it is a large, silver box. Th bottom of the power supply plugs directly into the logi board. Also locate the plastic latch that locks the powe supply into place. Place one hand on the plastic latch Pull the plastic latch away from the power supply cas while you simultaneously lift up on the bottom of th case. The power supply will unplug and pull out fro the logic board. Please refer to Figure 3C-2.

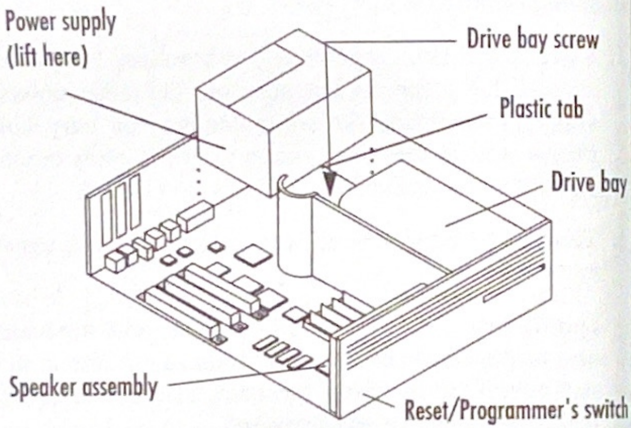

Figure 3C-2: Components on the Macintosh IIcx logic board

6. Remove the screw holding the drive bay to the logi board located at the rear of the drive bay assembl Please refer to Figure 3C-2.

7. Reach down by the drive bay screw, hold an disconnect the three cables form the logic board. Thes cables are the floppy disk drive, hard disk drive an power cables.

8. Release the latch on the right hand side of the drive ba assembly, slide the assembly towards the back and li it out of the case.

9. Remove the Reset/Programmer's switch at the fro left of the case by pulling up on the tab between th two black contacts on the logic board. Please refer t Figure 3C-2.

---

10. Remove the speaker assembly at the center front of the case by releasing the latch just above the SIMM sockets and tilting the assembly back and out of the case. Please refer to Figure 3C-2.

11. Slide the logic board to the front of the case and handling it by the edges only, lift the board out of the case.

Locating and Identifying CPU Type

12. Place the logic board on the foam packing that came with your Carrera040 accelerator. Locate the IIcx 68030 CPU on the logic board. The CPU location is labeled "UK10", which is near the hard disk drive SCSI cable connector. A socketed CPU is a gold square filled with a gray border. The gold square contains part number MC68030RC16B. The socketed CPU connects to a socket which attaches directly to the logic board. A soldered CPU consists of a black square with a gray border. The black square contains part number MC68030RL16B or XC68030RL16B. The soldered CPU attaches directly to the logic board.

Note: Do not attempt to remove a soldered CPU! This will severely damage the CPU and the logic board.

If You Have a Socketed CPU

13. If you have a socketed CPU, continue to follow the instructions at step 15.

If You Have a Soldered CPU

14. If you have a soldered CPU, remove the floppy and hard disk drive cables as well as the SIMMs from the logic board. You will need to ship your logic board to MicroMac Technology to be serviced. For a nominal fee MicroMac will:

- Unsolder the 68030 CPU
- Install a 68030 socket with the 68030 CPU
- Test the socket installation

Call MicroMac Technology at (714) 362-1000 for curre pricing information and to obtain an RMA number. Onc you receive an RMA number, carefully package the log board, write the RMA number on the outside of th package and send it to the address mentioned at th beginning of this manual.

Please remember to write the RMA number on th outside of the package.

---

15. To remove the 68030 CPU, you will need to use a lar flat-blade screwdriver. Carefully using the large fla blade screwdriver, gently pry the 68030 CPU from i socket by applying a small amount of pressure on eac side of the CPU. Do not try to remove the CPU b prying on one side only, this will damage the CPU an the socket. Gently raise the CPU a small amount o each side, slowly moving around the perimeter of th CPU five to six times until the CPU comes out evenl Please verify that the pins of the 68030 CPU are n bent or missing otherwise the CPU will not insta correctly onto the IIcx adapter. Please also inspect t socket on the logic board to make sure it is n damaged. The adapter board plugs into this socket.

Note: MicroMac will not assume any liability for damag to the 68030 CPU, the socket or the logic board so plea be careful!

Installation takes approximately 30 minutes.

16. Remove the IIcx adapter from its anti-static shippi bag.

17. Plug the IIcx adapter into the CPU socket on the II logic board. Figure 3C-3 shows the orientation of t adapter board on the logic board so the combination the adapter board and logic board can be reinstall into the IIcx case successfully. Make sure all the pi on the bottom of the adapter board mate with the socket on the logic board. Press firmly on the top of the IIcx adapter board above the logic board socket to make sure the IIcx adapter board pins are fully seated in the socket.

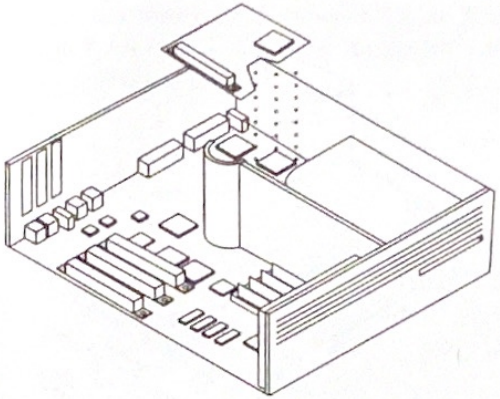

Figure 3C-3: Installing the IIcx adapter

18. Install the 68030 CPU into the socket on the IIcx adapter. Insert the CPU into the IIcx adapter socket "J2", aligning the pin-one indicator with the location "A1" on the IIcx adapter. Press down on the CPU and make sure that both the CPU and the IIcx adapter are firmly seated in their respective sockets.

19. Insert the logic board into the case, dropping it down over the guide pins. Slide the logic board to the rear of the case thereby locking the logic board under the guide pins.

20. Install the disk drive bay into the chassis by sliding it into position until the drive bay lock snaps into place. Install the drive bay chassis screw located in the lower left rear corner of the drive bay.

21. Reconnect the floppy and hard disk drive power cables.

22. Press the IIcx adapter board down to be sure it is firml seated, then reinstall the power supply as shown i Figure 3C-4. Align the tabs on the power supply wit the grooves on the Macintosh IIcx case. Gently slid the power supply into the case until you hear the powe supply snap into place.

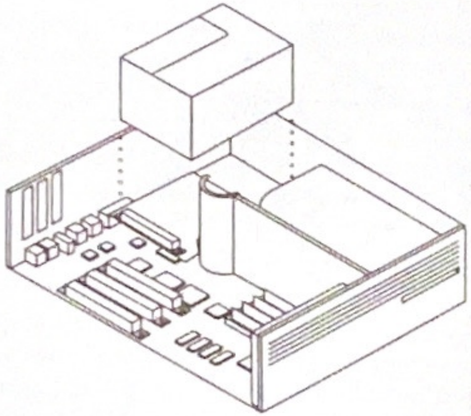

Figure 3C-4: Reinstalling the power supply

23. Hook up your monitor and boot the Mac with th adapter and 68030 CPU installed. Check for prope operation. If everything works correctly, continue wi the instructions at step 24. If the Mac does not boo correctly, recheck the installation of the adapter an 68030 CPU.

24. Remove the Carrera040 accelerator from its ant stating shipping bag.

25. If you are not installing the optional CarreraTurb 128K Cache card, continue to follow the instructions step 27.

CarreraTurbo 128K Cache Card Installation

26. Please follow these steps in order to install th CarreraTurbo 128K Cache card onto the Carrera04 accelerator:

    26a. Remove the CarreraTurbo 128K Cache card fro its anti-static shipping bag.

    26b. Locate the Cache Card Expansion Slot connector. The connector is located on the edge of the Carrera040 accelerator, opposite of the '040 CPU.

    26c. Install the Cache card onto the Expansion Slot connector by aligning the Cache card directly over the connector as shown in Figure 3C-5. Plug the Cache card onto the connector until it is completely seated.

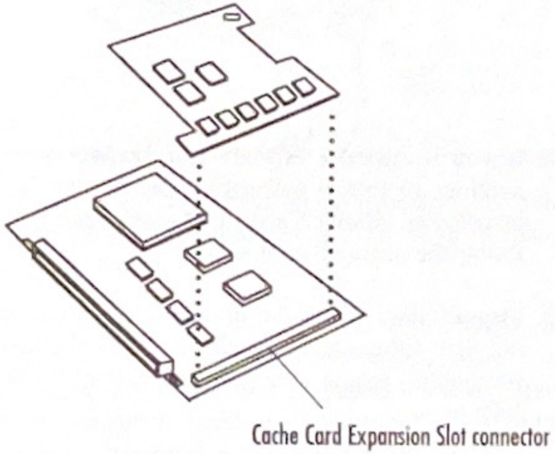

Figure 3C-5: Installing the CarreraTurbo Cache card onto the Carrera040 accelerator

Carrera040 Accelerator Installation

27. Carefully insert the Carrera040 accelerator into the connector on the IIcx adapter board as shown in Figure 3C-6. Align the 120-pin connector on the bottom of the card directly over the IIcx adapter's expansion connector. The large '040 CPU should be facing the metal power supply case. Push down firmly on the top edge of the Carrera040 accelerator until the edge is completely seated. **Do not** use excessive force or wiggle the accelerator from side to side. If the accelerator does not go in easily, pull it out and realign it over the connector.

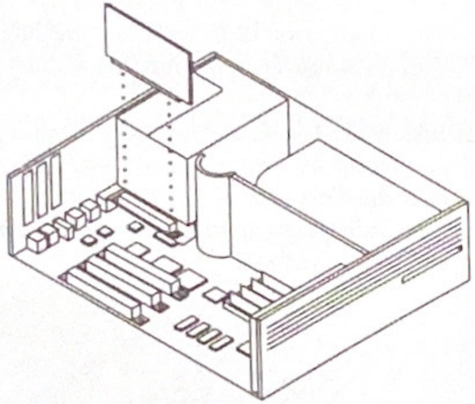

Figure 3C-6:
Installing the Carrera040 accelerator into the Macintosh IIcx

28. If you installed a 66MHz Carrera040 accelerato continue to follow the instructions at step 30. If yo installed an 80MHz Carrera040 accelerator, continue t follow the instructions at step 29.

Heatsink Fan Installation

29. Please follow these steps in order to install the heatsin fan that came attached with your 80MHz Carrera04 accelerator. Please refer to Figure 3C-7 as you follo each step.

29a. Locate the power cable with the two connecto on it that came with your heatsink fan. One shoul be a female white connector and the other a mal white connector.

29b. Locate the cable that is connected to the back o your Mac's internal hard disk drive an disconnect it.

29c. Install the female white connector on the powe cable to the back of the hard disk drive and th male white connector to the cable that was wa originally plugged into the hard disk drive.

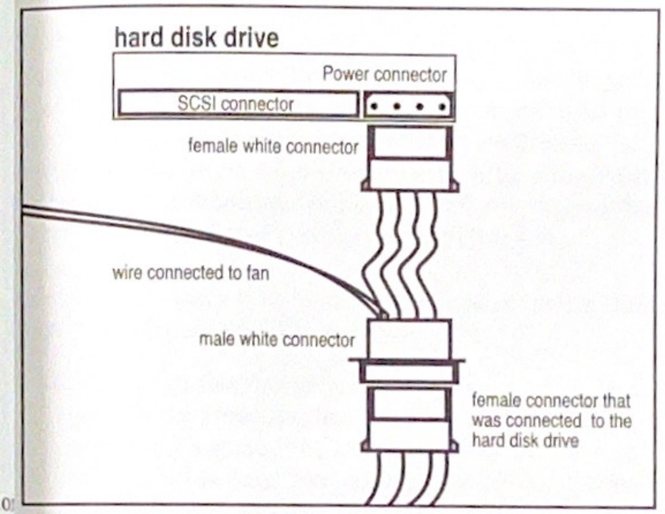
hard disk drive
Power connector
SCSI connector
female white connector
wire connected to fan
male white connector
female connector that was connected to the hard disk drive

Figure 3C-7:
Installing the heatsink fan

30. Replace the case cover back on the computer. Press the cover down until the latches snap into place. Replace and tighten the security screw.

31. Congratulations! You have now completed the hardware installation of the Carrera040 accelerator. You are now ready to install the Carrera040 software. Please refer to Chapter 4, "Software Installation" to install the necessary software for your Carrera040 accelerator.

Macintosh IIx Installation

Installation for the Macintosh IIx involves removing the logic board, identifying the 68030 CPU type, installing the Carrera040 accelerator into the IIx adapter and installing the adapter into the logic board. If the 68030 CPU is soldered, the logic board will need to be shipped to MicroMac Technology. For a nominal fee, MicroMac Technology will install a socket for the 68030 CPU.

Logic Board Removal

Please follow steps 1-16 to locate and remove the IIx logic board and identify the CPU type:

1. Shut down the computer and disconnect the power cord. If the computer has been on, the metal power-supply case inside the computer may be very hot. Please wait at least five minutes until it cools before you begin the installation.

2. Turn off all peripheral devices, including any external monitors.

   During installation, you will need to move the main unit of the computer. You may want to disconnect the peripheral cables from the back of the computer, including the mouse and keyboard.

3. Locate the security screw as shown in Figure 3D-1 and use a philips screwdriver to remove the security screw on the back of the computer case cover.

4. Press and release the two lid latches as shown in Figure 3D-1 and lift the case cover off.

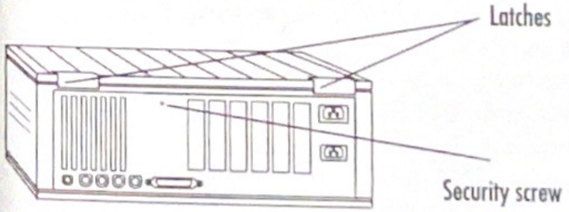

Figure 3D-1: Location of security screw and latches

5. Remove the four screws attaching the drive shelf to t computer case. Now disconnect the floppy disk dri hard disk drive and power cables and gently lift t drive shelf out from the case as shown in Figure 3D-2

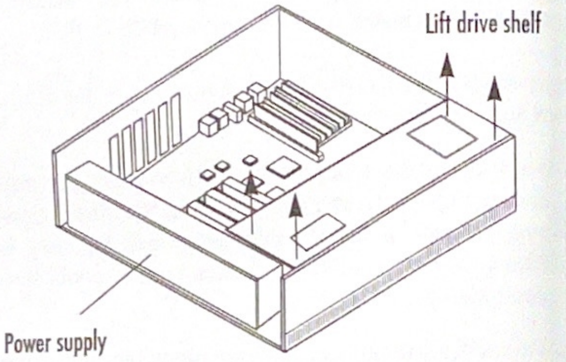

Figure 3D-2:
Location of drive shelf

6. Once you have removed the drive shelf, locate the log board and refer to Figure 3D-3 as you proceed remove the logic board from the case.

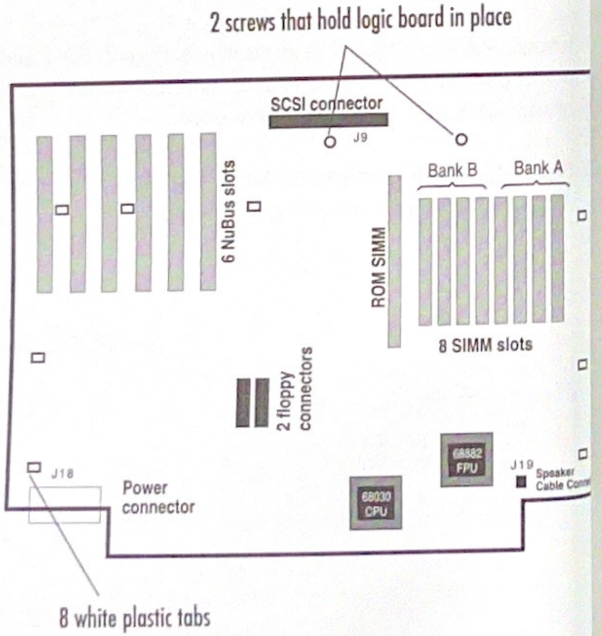

Figure 3D-3:
IIx logic board

7. Remove any video or Nubus cards that are installed in the Nubus slots.

8. Remove the Reset/Programmer's switch if you have one installed, located on the outside of the computer case on the right hand side.

9. Remove the speaker cable connector from the logic board located at J-19.

10. Remove the power supply connector from the logic board at J-18.

11. Remove the two screws that hold the logic board in place located by the hard disk drive ribbon connector (SCSI connector) at J-9.

12. Locate the eight white plastic clips that lock the logic board in place. The clips are released by pressing the exposed portion towards the front of the case. Release the clips and lift the board, starting with the clip closest to the front center of the case, then the left front, then the right. Keep working from left to right to release all the clips. Slide the logic board to the rear of the case and remove.

Locating and Identifying CPU Type

13. Place the logic board on the foam packing that came with your Carrera040 accelerator. Locate the IIx 68030 CPU on the logic board. The CPU location is labeled "UKI11", which is located left of the speaker. A socketed CPU is a gold square filled with a gray border. The gold square contains part number MC68030RC16B. The socketed CPU connects to a socket which attaches directly to the logic board. A soldered CPU consists of a black square with a gray border. The black square contains part number MC68030RL16B or XC68030RL16B. The soldered CPU attaches directly to the logic board.

Note: Do not attempt to remove a soldered CPU! This will severely damage the CPU and the logic board.

If You Have a Socketed CPU

14. If you have a socketed CPU, continue to follow th instructions at step 16.

If You Have a Soldered CPU

15. If you have a soldered CPU, remove the floppy an hard disk drive cables as well as the SIMMs from th logic board. You will need to ship your logic board t MicroMac Technology to be serviced. For a nomin fee MicroMac will:

    - Unsolder the 68030 CPU
    - Install a 68030 socket with the 68030 CPU
    - Test the socket installation

Call MicroMac Technology at (714) 362-1000 for correc pricing information and to obtain an RMA number. Onc you receive an RMA number, carefully package the logi board, write the RMA number on the outside of th package and send it to the address mentioned at th beginning of this manual.

Please remember to write the RMA number on th outside of the package.

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16. To remove the 68030 CPU, you will need to use a larg flat-blade screwdriver. Carefully using the large flat blade screwdriver, gently pry the 68030 CPU from it socket by applying a small amount of pressure on eac side of the CPU. Do not try to remove the CPU b prying on one side only, this will damage the CPU an the socket. Gently raise the CPU a small amount o each side, slowly moving around the perimeter of th CPU five to six times until the CPU comes out evenl Please verify that the pins of the 68030 CPU are no bent or missing otherwise the CPU will not instal correctly onto the IIcx adapter. Please also inspect th socket on the logic board to make sure it is no damaged. The adapter plugs into this socket.

Note: MicroMac will not assume any liability for damage to the 68030 CPU, the socket or the logic board so please be careful!

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17. Reinstall the logic board. Lower the logic board into the case by inserting the ports on the logic board into the matching holes at the rear of the case. Lower the front of the logic board and push down to snap all the clips into place.

18. Connect the power supply connector to the logic board at J-18.

19. Reinstall the two screws located next to the hard disk drive ribbon connector (SCSI connector) at J-9.

20. Connect the speaker cable to the logic board at J-19.

21. Reinstall any NuBus cards into the NuBus slots.

22. Reinstall the Reset/Programmer's switch.

Carrera040 Adapter Installation

Installation takes approximately 30 minutes.

23. Remove the IIx adapter from its anti-static shipping bag.

24. Install the 68030 CPU into the socket on the IIx adapter. Insert the CPU in the IIx adapter socket "J2", aligning the pin-one indicator with the location "A1" on the IIx adapter. Press down on the CPU and make sure that the CPU is firmly seated in the socket.

25. Install the IIx adapter onto the logic board. Carefully lower the adapter into the socket you removed the 68030 CPU from. The pin alignment must be checked carefully so no pins are damaged as the adapter is pressed down into the socket. Also make sure all the pins mate with a corresponding hole in the socket.

26. Hook up your monitor and boot the Mac with th adapter and 68030 CPU installed. Check for prope operation. If everything works correctly, continue wi the instructions at step 27. If the Mac does not boo correctly, recheck the installation of the adapter an 68030 CPU.

27. Unplug the IIx adapter from the logic board.

28. Remove the Carrera040 accelerator from its anti-stati shipping bag.

29. If you are not installing the optional CarreraTurb Cache card, continue to follow the instructions at ste 31.

CarreraTurbo 128K Cache Card Installation

30. Please follow these steps in order to install th CarreraTurbo 128K Cache card onto the Carrera04 accelerator.

    30a. Remove the Cache card from its anti-stati shipping bag.

    30b. Locate the Cache Card Expansion Slot connecto The connector is located on the edge of th Carrera040 accelerator, opposite of the '040 CPU

    30c. Install the Cache card onto the Expansion Sl connector by aligning the Cache card directl over the connector as shown in Figure 3D-4. Plu the Cache card into the connector until it completely seated.

Carrera040 Accelerator Installation

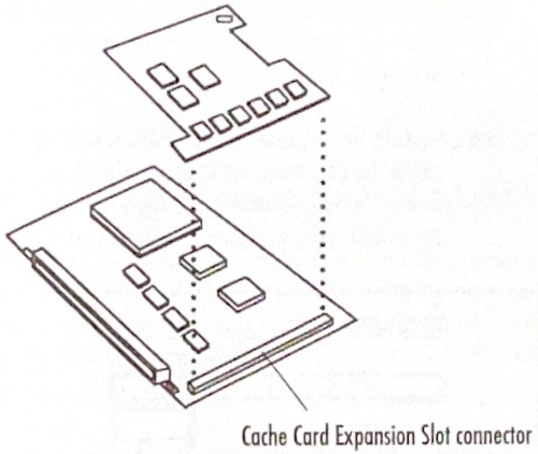


Figure 3D-4: Installing the CarreraTurbo Cache card onto the Carrera040 accelerator

31. Plug the Carrera040 accelerator into the IIx adapter by mating the PDS socket on the IIx adapter to the PDS connector on the Carrera040 accelerator. Press them firmly together to make certain there is a tight fit.

32. Install the IIx adapter onto the logic board. Turn the adapter until the accelerator is toward the right side of the case, then carefully lower the adapter into the socket you removed the 68030 CPU from. The pin alignment must be checked carefully so no pins are damaged as the adapter is pressed down into the socket. Also make sure all the pins mate with a corresponding hole in the socket.

Heatsink Fan Installation

33. If you installed a 66MHz Carrera040 accelerator, continue to follow the instructions at step 35. If you installed an 80MHz Carrera040 accelerator, continue to follow the instructions at step 34.

34. Please follow these steps in order to install the heatsink fan that came attached with your 80MHz Carrera040 accelerator. Please refer to Figure 3D-5 as you follow each step.

    34a. Locate the power cable with the two connectors on it that came with your heatsink fan. One should be a female white connectors and the other a white male connector.

34b. Locate the cable cable that is connected to t back of your Mac's internal hard disk drive a disconnect it.

34c. Install he female white connector on the pow cable to the back of the hard disk drive and t male white connector to the cable that w originally plugged into the hard disk drive.

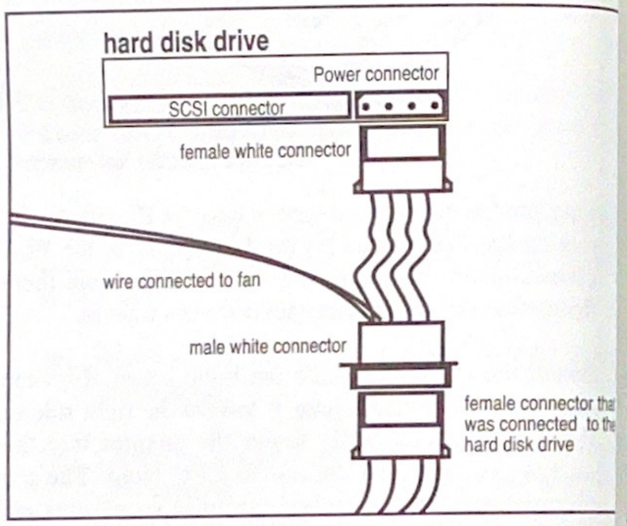


Figure 3D-5:
Installing the heatsink fan

35. Replace the case cover back on the computer. Press t case down until the latches snap into place. Repla and tighten the security screw.

36. Congratulations! You have now completed t hardware installation of the Carrera040 accelerato You are now ready to install the Carrera040 softwar Please refer to Chapter 4, "Software Installation" install the necessary software for your Carrera04 accelerator.

Carrera040 Software Installation

This chapter explains how to install and use the Carrera040 Control Panel. Once installed in your Macintosh, the Carrera040 Control Panel offers the following features:

- A main on/off switch.
- A menu bar icon that displays the Carrera040's speed.
- The ability to select three different operating speeds: '030 SLOW, '040 MED and '040 FAST. These three speeds allow you the flexibility of using your older 68030 software as well as the latest features of 68040 software.
- An automatic speed selector that will "downshift" your Carrera040 when you launch applications that are not fully compatible with the '040 processor. This feature allows you run all your software, even if it is not compatible with the '040 processor.

Installing the Carrera040 Control Panel

You must install the Carrera040 Control Panel software into the System folder on your hard disk drive before using the Carrera040 accelerator. Furthermore, you must be using System 7.0 or greater.

To install the necessary Carrera040 software, please follow these steps:

1. Turn on your Mac.
2. After the Mac boots, insert the Carrera040 Start-up disk and read any "READ ME" files on the disk for latest Carrera040 update information.
3. Copy the Carrera040 Control Panel located in the Control Panels folder on the Carrera040 Start-up disk into the System folder on the hard disk as shown in Figure 4-1.

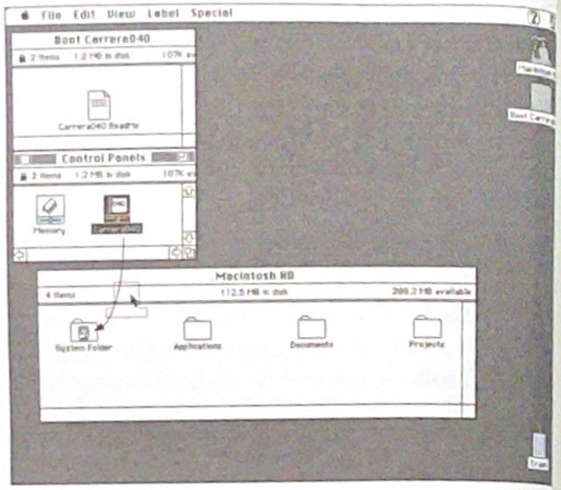

File Edit View Label Special
Boot Carrera040
Carrera040 ReadMe
Control Panels
Memory
Carrera040
Macintosh HD
System Folder
Applications
Documents
Projects
Trash

Figure 4-1:
Installing the Carrera040 Control Panel

The Carrera040 Control Panel will automatically co into the Control Panels folder.

4. If you are using a Mac IIsi or IIci, please skip to step If you are using a Mac IIcx or IIx, you need to inst Connectix's Mode32 in order to make the Mac's lo board ROMs 32-bit clean.

5. If you are running System 7.0–7.1, install Mode from the Carrera040 Utilities disk into the Syst folder on the hard disk as shown in Figure 4-2.

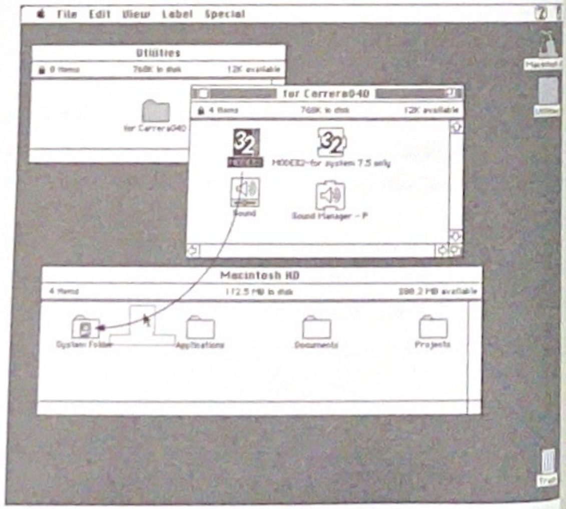

File Edit View Label Special
Utilities
for Carrera040
MODE32
MODE32–for system 7.5 only
Sound
Sound Manager – P
Macintosh HD
System Folder
Applications
Documents
Projects
Trash

Figure 4-2:
Installing Mode32 for the IIcx and IIx

6. If you are running System 7.5, install Mode32 designated for System 7.5 from the Carrera040 Utilities disk into the System folder on the hard disk as shown in Figure 4-3.

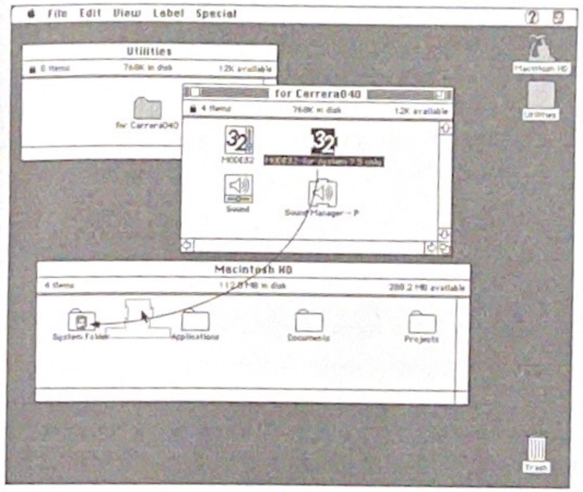

File Edit View Label Special
Utilities
for Carrera040
MODE32
MODE32–for System 7.5 only
Sound
Sound Manager – P
Macintosh HD
System Folder
Applications
Documents
Projects
Utilities
Trash

Figure 4-3:
Installing Mode32 for the IIcx and IIx running System 7.5

7. Activate the hard disk window and select the Control Panels folder through the menu.

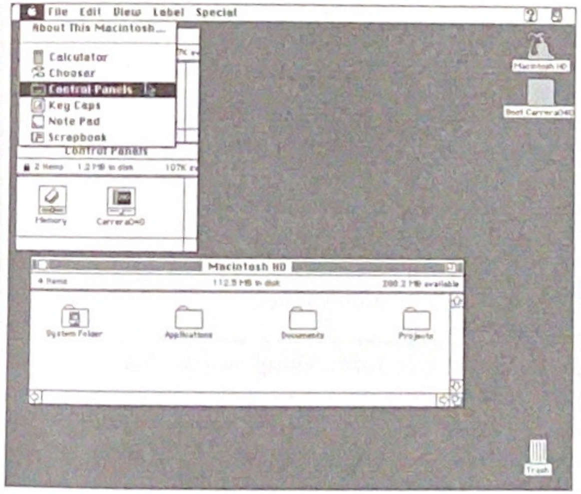

File Edit View Label Special
About This Macintosh...
Calculator
Chooser
Control Panels
Key Caps
Note Pad
Scrapbook
Memory
Carrera040
Macintosh HD
System Folder
Applications
Documents
Projects
Boot Carrera040
Trash

Figure 4-4:
Selecting the Control Panels folder

8. Locate and double-click on the Memory Control Panel to activate it as shown in Figure 4-5.

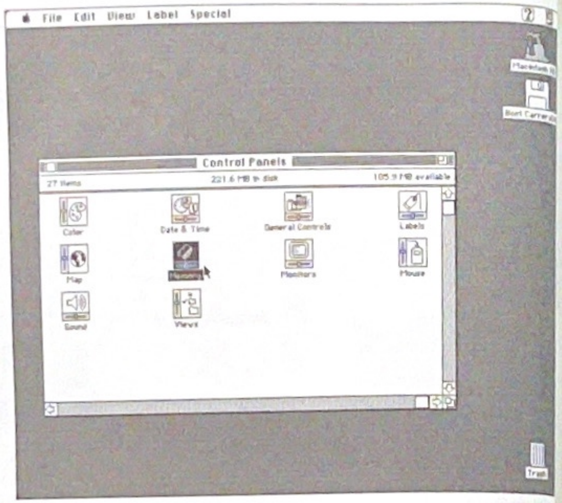
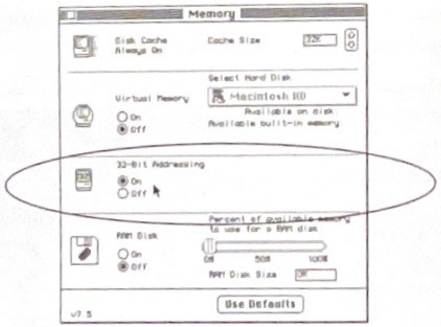

File Edit View Label Special
Control Panels
27 items
221.6 MB in disk
105.9 MB available
Color
Date & Time
General Controls
Labels
Map
Memory
Monitors
Mouse
Sound
Views
Macintosh HD
Boot Carrera040
Trash

Figure 4-5:
Locating the Memory Control Panel

9. The Memory Control Panel will appear as shown Figure 4-6. In order for the Carrera040 accelerator operate correctly, 32-Bit Addressing must be clicke on. If 32-Bit Addressing is clicked off, please click on at this time.


Memory

Disk Cache Always On — Cache Size 32K

Virtual Memory ○ On ● Off — Select Hard Disk: Macintosh HD

32-Bit Addressing ● On ○ Off

RAM Disk ○ On ● Off — RAM Disk Size 0K

Available on disk:
Available built-in memory:
Percent of available memory to use for a RAM disk:
0%
50%
100%
Use Defaults
v7.5

Figure 4-6:
Memory Control Panel

10. Once 32-Bit Addressing is clicked on, you may clo the Memory Control Panel.

Note: If 32-Bit Addressing is not enabled, you m experience System lock-ups and/or crashes while runni applications.

---

11. Restart your Mac. You should hear a familiar chi after restarting. If you do not hear this chime, plea refer to Appendix A, "Troubleshooting Guide" f compatibility and troubleshooting information.

Using the Carrera040 Control Panel

With the Carrera040 Control Panel you are able to adjust the speed of the Carrera040 accelerator as well as disable it.

In order to use the Carrera040 Control Panel, please follow these steps:

1. Activate the hard disk window and open the Control Panels folder through the menu.

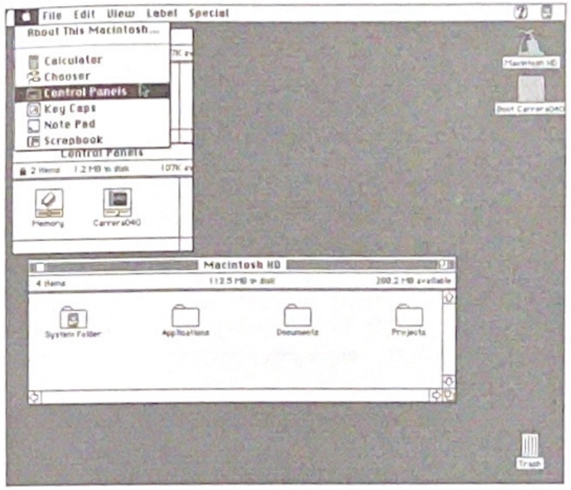

File Edit View Label Special
About This Macintosh...
Calculator
Chooser
Control Panels
Key Caps
Note Pad
Scrapbook
Control Panels
2 items
Memory
Carrera040
Macintosh HD
4 items
System Folder
Applications
Documents
Projects
Macintosh HD
Boot Carrera040
Trash

Figure 4-7:
Opening the Control Panels folder

2. Locate and double-click on the Carrera040 Control Panel to activate it.

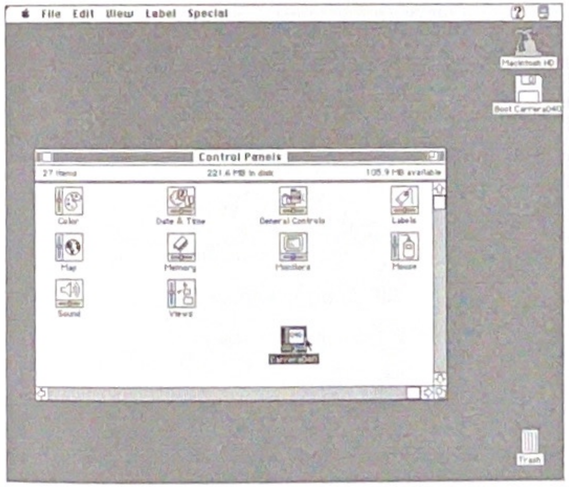

File Edit View Label Special
Control Panels
27 items
221.6 MB in disk
105.9 MB available
Color
Date & Time
General Controls
Labels
Map
Memory
Monitors
Mouse
Sound
Views
Carrera040
Macintosh HD
Boot Carrera040
Trash

Figure 4-8:
Locating Carrera040 Control Panel

The Carrera040 Control Panel

3. The Carrera040 Control Panel should appear on you screen as shown in Figure 4-9.

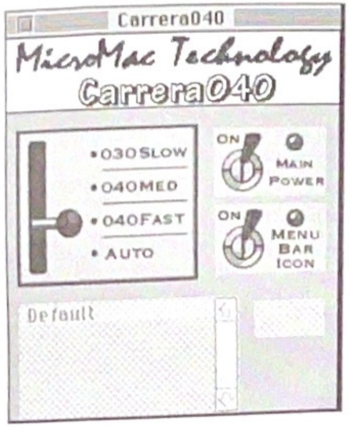

Carrera040
MicroMac Technology
Carrera040
•030 SLOW
•040 MED
•040 FAST
• AUTO
ON
MAIN POWER
ON
MENU BAR ICON
Default

Figure 4-9:
The Carrera040 Control Panel

Main Power Switch

4. The Main switch:

ON
MAIN POWER

Figure 4-10:
Main Power switch

The Main Power switch is used to tur the Carrera040 accelerator on and off When the Main Power switch i turned off, the Carrera040 Contro Panel will not load and initialize th Carrera040 accelerator when you boot your Mac. If yo click this switch off and on, you must restart your Mac i order in order for changes to take effect.

Menu Bar Icon

5. The Menu bar icon:

ON
MENU BAR ICON

Figure 4-11:
Menu bar icon

The Menu bar icon indicates the spee of the Carrera040 accelerator. Whe this switch is clicked on, a small ico will appear in the upper right han corner of the screen to indicate th speed of the Carrera040 accelerator:

Ⓢ '030 SLOW mode

Ⓜ '040 MED mode

Ⓕ '040 FAST mode

Figure 4-12:
Speed indicators

To enable and disable the Menu bar icon, simply click o the Menu bar icon switch.

Making Your Speed Selection

6. Selecting a desired speed:

The Carrera040 Control Panel automatically sets the Carrera in '040 FAST mode. If you wish to change the speed of the Carrera040 accelerator, click on the speed selector handlebar. After you select the new speed, close the Carrera040 Control Panel.

SLOW:

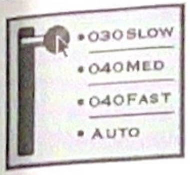

•030 SLOW
•040 MED
•040 FAST
• AUTO

Figure 4-13:
'030 SLOW mode

'030 SLOW operates with the original CPU in your computer, usually a 68030. Use this speed if you run into a compatibility problem and want to check compatibility on your original 68030 CPU.

MED:

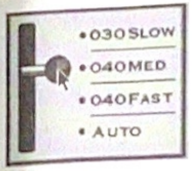

•030 SLOW
•040 MED
•040 FAST
• AUTO

Figure 4-14:
'040 MED mode

'040 MED operates with the '040 CPU on the Carrera040 accelerator using the write-through cache. This speed should be compatible with all of your software.

FAST:

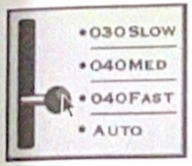

•030 SLOW
•040 MED
•040 FAST
• AUTO

Figure 4-15:
'040 FAST mode

'040 FAST operates with the '040 CPU on the Carrera040 accelerator using the copy-back cache. This speed should be compatible with most software. Old versions of some applications may not be compatible.

AUTO:

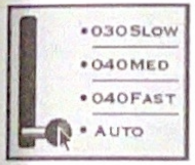

•030 SLOW
•040 MED
•040 FAST
• AUTO

Figure 4-16:
AUTO mode

AUTO uses the full '040 speed unless you open an application that is known to have a conflict with the copy-back cache. The Carrera040 accelerator will then slow down to a compatible speed when that application is launched.

Using the AUTO Speed Selector

If you have applications that are not fully compatible wi the 68040 processor, you can configure the Carrera04 accelerator to automatically slow down when tho applications are opened.

For maximum performance, it is best to update yo software to the most current version that is compatible wi the 68040 processor. The AUTO speed selector, howeve offers an immediate solution to any '040 incompatibili For example, Aldus Persuasion 1.0 is not compatible wi the copy-back cache of the 68040 processor. This means will not run on a Macintosh Quadra, Centris or any thir party '040 accelerator cards (such as the Carrera040 in '04 FAST mode) with the copy-back cache turned o However, it is compatible with the write-through cache the 68040 processor ('040 MED mode on the Carrera040).

If you encounter an application that will not run in the '04 FAST mode, use the the AUTO speed selector to downshi the speed of the Carrera040 accelerator. For this exampl we will use Aldus Persuasion 1.0.

1. Select AUTO in the Carrera040 Control Panel.

2. Click on the Add Selector button.

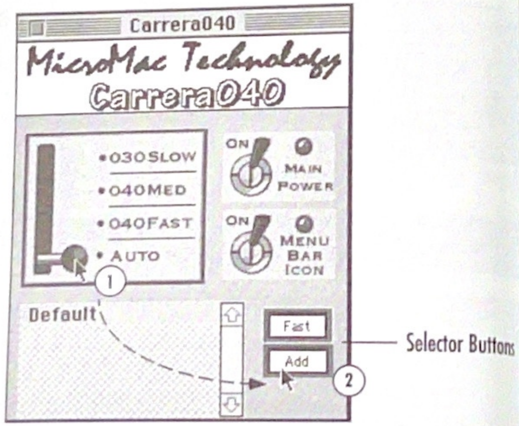

Carrera040
MicroMac Technology
Carrera040
•030 SLOW
•040 MED
•040 FAST
• AUTO
ON
MAIN POWER
ON
MENU BAR ICON
Default
Fast
Add
1
2
Selector Buttons

Figure 4-17: Using the AUTO speed selector

3. Locate the application(s) on your hard disk you would like the Carrera040 accelerator to reduce speed for (in this example, Aldus Persuasion 1.0).

4. Double-click on the application as though you were launching the program or click "Open" in the dialog box.

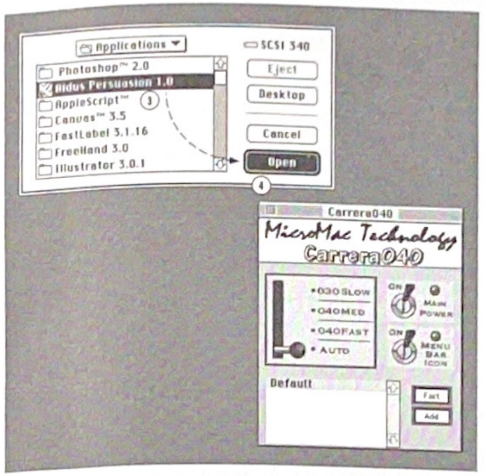

Applications
SCSI 340
Photoshop™ 2.0
Aldus Persuasion 1.0
AppleScript™
Canvas™ 3.5
FastLabel 3.1.16
FreeHand 3.0
Illustrator 3.0.1
Eject
Desktop
Cancel
Open
3
4
Carrera040
MicroMac Technology
Carrera040
•030 SLOW
•040 MED
•040 FAST
• AUTO
ON
MAIN POWER
ON
MENU BAR ICON
Default
Fast
Add

Figure 4-18: Selecting application for AUTO mode

5. Highlight the application you wish to change the speed of (in this example, Aldus Persuasion 1.0).

6. Select the speed that accommodates the application under the Speed selector button. The Speed selector button is automatically set to *Fast.*

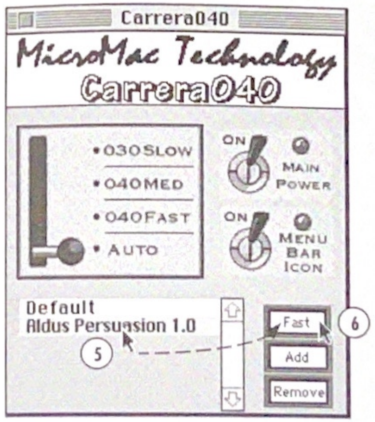

Carrera040
MicroMac Technology
Carrera040
•030 SLOW
•040 MED
•040 FAST
• AUTO
ON
MAIN POWER
ON
MENU BAR ICON
Default
Aldus Persuasion 1.0
Fast
Add
Remove
5
6

Figure 4-19: Selecting application for new AUTO speed

7. To change the designated speed for an application, y will need to hold down the button on the mouse make the speed selection under the pop-up menu (this example, *Med.* selected for Aldus Persuasion 1.0)

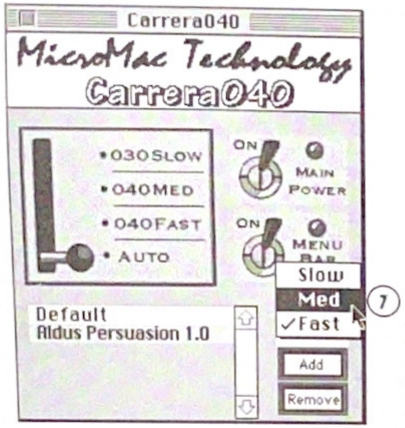


Figure 4-20:
Selecting an application's new AUTO speed

When you open the application from now on, th Carrera040 accelerator will automatically shift to the ne speed you have selected. With this feature, the Carrera04 accelerator allows you to open multiple applications, eac running at a different speed. As you switch fro application to application, the Carrera040 accelerator wi shift speeds automatically.

Setting the Default Speed to AUTO

You can change the default speed for the Carrera04 accelerator when AUTO is selected. In the scrollable list o applications, select "Default" then select the new speed fo the Carrera040 accelerator. *Fast* is the pre-set an recommended default speed for the Carrera040 accelerato

Disabling the Carrera040 Accelerator

To disable the Carrera040 accelerator hold down the mous button when you boot your Mac. Otherwise, select th Carrera040 Control Panel and turn the Main Power switc off. Changes will not take effect until the Mac is restarted.

Troubleshooting Guide

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Compatibility Tips

The Carrera040 accelerator has been designed to maxim compatibility with all Macintosh software and hardwa Before you begin using your Carrera040 accelerator, plea follow the Compatibility Tips listed below. They will ass you in making a smooth transition to a high-performan Carrera040-equipped Macintosh. If you encounter a problems with your Carrera040 accelerator, please cons the solutions provided in this section before calling t MicroMac Technical Support department.

- Make certain 32-Bit Addressing is turned on in t Memory Control Panel.
- You need to be running System 7.0 or greater. (If you choose to use System 7.0 or 7.0.1 you mu use Tune-up 1.1 on your System 7 software.)
- If you use third-party software like Silverlining™ FWB Hard Disk Toolkit™ to format, initialize install new drivers on your hard disk, do not use t "blind transfers" option. Instead use the "Silverlin Fast Handshake" driver in Silverlining™ a deselect the "blind transfers" option in FWB Ha Disk Toolkit™.
- If possible, upgrade your applications to the mo current versions available. Most softwa compatibility problems with '040 accelerato Quadra or Centris Macs are caused by old versio of applications which are not compatible with t 68040 processor's copy-back cache ('040 FAS mode on the Carrera040 accelerator). Though y can "shift-down" to either '040 MED or '030 SLO mode to maintain compatibility with the applications, you will not enjoy the full '040 spe benefit of the product.

Installation Tips

During Installation:

- Make certain that 32-Bit Addressing is turned on when using the Carrera040 accelerator. If 32-Bit Addressing is off, you may experience System lock-ups while the Mac boots.
- Make certain that Virtual Memory is turned off when using the Carrera040 accelerator. The Carrera040 accelerator is not compatible with Virtual Memory.
- Connectix's RAMDoubler should be disabled when using the Carrera040 accelerator. It is currently incompatible with the Carrera040 accelerator.
- The Carrera040 accelerator is currently compatible with System 7.0, 7.0.1, 7.1 and System 7.5. (If you choose to use System 7.0 or 7.0.1 you must use Tune-up 1.1 on your System 7 software.)

General Issues

General Issues:

- Ethernet cards: The Carrera040 accelerator is compatible with most Ethernet cards. However, if the Ethernet card uses the National Semiconductor part called the "Sonic" (National part number DP83932) it will not be compatible. This typically only effects users of Mac IIsi.
- Graphics cards in slot E: If you have trouble booting your Mac IIci with a Carrera040 accelerator and you have a NuBus graphics card installed in slot E (the NuBus slot closest to the power supply), try relocating the graphics card into another NuBus slot.

Unexpected Quits

Unexpected Quits from Applications:

- These are very uncommon and usually occur due to lack of application memory. Try adjusting the application memory set-up in the "Get Info" window of the application even if everything was working fine prior to the installation of the Carrera040 accelerator.

Software Compatibility

Applications that do not work with a Macintosh Quadra o Centris most likely will not work with an '040 accelerato including the Carrera040 accelerator. Generally, thes incompatibilities are limited to the 68040 processor' copy-back cache ('040 FAST mode on the Carrera04 accelerator). Below is a list of versions of applicatio that are incompatible with the 68040 processor's copy-back cache ('040 FAST mode on the Carrera04 accelerator). Please refer to the section on using th AUTO speed selector in Chapter 4, "Softwar Installation" to adjust the speed of the Carrera04 accelerator when using one of these applications.

Please note that only the versions of the applicatio listed below are incompatible with the Carrera04 accelerator in '040 FAST mode. Current versions of th applications are fully compatible.

Application	**Incompatible Versio**
After Dark	less than 2.0x
Adobe Illustrator '88	1.9.5
Adobe Photoshop	1.0–2.0
Adobe Premiere	1.0
Aldus Freehand	2.2
Aldus PageMaker	3.9–4.01
Aldus Persuasion	1.0
Ashlar Vellum 3D	2.0–2.1
BeagleWorks	1.0–1.0.1
CalendarMaker	3.0–3.0.2
FastEnvelope	2.0–3.0
GOfer	2.0
Mathematica	1.2
Microsoft Excel	1.5–3.0
Microsoft Word	3.0–4.0d
Ofoto	1.0–2.01
Studio/1	1.0
Studio/8	1.0–2.01
Studio /32	1.1–1.2
THINK C	4.0–4.05
WordScan	1.0
Wordfinder	2.0

Troubleshooting Recommendations

A Carrera040 Start-up disk is supplied with your Carrera040 accelerator and can be used to aid in troubleshooting your Mac. The Start-up disk has the necessary software to boot your Mac with the accelerator installed.

Booting with the Start-up Disk

When you cannot boot from the hard disk with the accelerator installed, try booting with the Start-up disk.

Note: Booting from the Start-up disk by-passes the System folder on the hard disk and uses the one on the Start-up disk.

If you have more than one hard disk drive installed on your Mac, disconnect all but the one you want to boot from and boot again from the Start-up disk. If you still get errors or System lock-ups, disconnect all SCSI devices as well as the internal hard disk drive. Boot with the Start-up disk and check the operation of the Mac. If the problem still persists please call the MicroMac Technical Support department for assistance.

If booting from the Start-up disk appears to function correctly then your problem is most likely on the hard disk or the hard disk drive itself. You will need to try installing a Temporary System on the hard disk. Please refer to Appendix B, "Macintosh Procedures" on how to install a Temporary System. If the Mac boots from the hard disk with the Temporary System installed then do a New System ("Clean System") installation of your System software. If the Mac does not boot from the hard disk with the Temporary System then install a new hard disk driver or back up the hard disk, reformat it and install a New System.

If the operation of your Mac still appears unstable, please call the MicroMac Technical Support department for further assistance.

Your MicroMac Carrera040 accelerator has been tested before shipping. If you have encountered any problems with the installation or operation of your Carrera040 accelerator, this Troubleshooting Guide will assist you in troubleshooting your accelerated Mac.

Isolating the Problem

Generally, careful analyzing and methodical isolation are the fastest way to get to the source of the problem. The crash of your accelerated Mac may, for example, result from:

- Improper installation of the Carrera040 accelerator
- A corrupted System folder
- Incompatible Extensions (INITs) and/or Control Panels in the System folder
- An outdated version of your hard disk driver software
- An old version of an application
- A defective or loose SCSI cable
- Improver termination on the SCSI bus
- A corrupted boot block on the hard disk drive
- Improper heap allocation for your System
- Improper memory configuration on the logic board
- Bad SIMMs on the logic board
- A defective power supply
- A defective logic board

Any of these causes may result in similar symptoms, therefore, it is important to proceed methodically to isolate the problem.

Identifying the Problem

It is important to classify whether the problem is intermittent, repeatable with slightly different symptoms or repeatable with identical symptoms. Each problem may either be caused by software or hardware, but this classification helps you and/or the Technical Support personnel at MicroMac Technology pinpoint the problem(s).

Intermittent or Repeatable Problems

Intermittent crashes happen at unpredictable times and intervals. They typically indicate a hardware problem, but may also point to a more complicated software problem.

Repeatable crashes with slightly different symptoms are invoked by following a well defined set of actions. Each crash manifests itself with slightly different symptoms.

Repeatable crashes with identical symptoms can be invoked by following a well defined set of actions. Each crash manifests itself with identical symptoms.

Problem caused by Software or Hardware

As a next step it is a good idea to determine whether the problem is caused by software or hardware. A good technique is to boot the accelerated Mac from the back-up of the Carrera040 Start-up disk (Did you remember to back-up your disk?? If you haven't already done so, please do it now). Try to create a repeatable crash or work a while to find out whether an intermittent crash occurs.

Additionally it may be necessary to disconnect any external hard disk drives as well as the internal hard disk drive and the SCSI cable and work only with the floppy disk drive to eliminate the possible influence of any SCSI devices, especially the influence of a corrupted boot block or a corrupted System file on the hard disk.

The cause is most likely a software problem if your System does not crash while booting from a floppy disk drive.

If you have made many upgrades at the same time, try running your Mac without the Carrera040 accelerator installed. If you are not able to easily solve a problem with your accelerated Mac, you may wish to contact your dealer or MicroMac Technology for technical support.

However, the fastest and most economical solution to your problem is to read through the Troubleshooting Guide before consulting the MicroMac Technical Support department. In many cases the Technical Support personnel will ask you to run the tests described in this chapter.

Technical Support Checklist

If you still have a problem after consulting the Troubleshooting Guide, please have the foregoing information and answers available before contacting the MicroMac Technical Support department.

Technical Support Questions Checklist

- ☐ Your particular Mac model
- ☐ The MicroMac accelerator you own
- ☐ Product configuration (Speed in MHz, whether an FPU or SIMMs are installed, etc.)
- ☐ Problem description
- ☐ Sequence of steps to reproduce the problem
- ☐ System software version number
- ☐ Exact text of any error messages
- ☐ Application software version
- ☐ List of Extensions (INITs) and Control Panels
- ☐ Hard disk drive model number and manufacturer
- ☐ What are the SCSI IDs?
- ☐ Is the SCSI bus correctly terminated?
- ☐ Is the Mac connected to a network?
- ☐ What printer are you using?
- ☐ What is the amount of free heap space available?

Technical Support can be reached at **(714) 362-4953.** Support hours are between 8:30 A.M. and 4:30 A.M. PST.

Notes

Mac will not Boot

Symptom:	**The Mac does not boot. The only item that appears on the screen is a disk icon with a blinking "?".**
Explanation:	The Mac cannot locate the needed resource files in order to boot the System software.

Possible Cause:	**Remedy:**
32-Bit Addressing turned off	Restart your Mac while holding down the Shift key. Open the Memory Control Panel and make certain 32-Bit Addressing is turned on. If it is not, select it and restart your Mac.
Hard disk drive may be using "blind transfer" drivers	Verify hard drive transfer with an utility program such as Silverlining™ or FWP Hard Disk Toolkit™ to see if it is using "blind transfer" drivers. If you have "blind transfer" drivers installed, you will need to reinstall drivers that do not use this feature. Please refer to "Compatibility Tips" earlier in this chapter for additional information.
Incompatible System software	If you are running System software earlier than System 7.0 then it is incompatible with the Carrera040 accelerator. Reinstall your System with the most current System software. (If you are installing System 7.0 or 7.0.1, make sure you also install System 7 Tune-up 1.1.)

Mac Freezes while It Boots

Symptom:	**Mac freezes while it's booting or when it trys to load the Carrera040 Control Panel.**
Explanation:	Most likely 32-Bit Addressing is not turned on.

Possible Cause:	**Remedy:**
32-Bit Addressing turned off	Restart your Mac while holding down the Shift key. Open the Memory Control Panel and make sure 32-Bit Addressing is turned on. If it is not turn on, select it and restart your Mac.

Mac Freezes as It Loads Extensions (INITS) and Control Panels

Symptom:	**Mac freezes while it's loading Extensions (INITs) and Control Panels.**
Explanation:	You may have a conflict with a Control Panel or Extension.

Possible Cause:	**Remedy:**
Incompatible Control Panel or Extension	First verify that your Carrera040 accelerator is working properly by booting your Mac with the Carrera040 Start-up disk. If your Carrera040 accelerator properly works, restart your Mac while holding down the Shift key (Extensions off). After the Mac finishes booting, remove all your non-Apple Control Panels and Extensions from the System folder on the hard disk. Copy the Carrera040 Control Panel from the Carrera040 Start-up disk into the Control Panels folder (located inside the System folder) on the hard disk and restart your Mac. Add each Control Panel and Extension into the System folder one at a time, restarting your Mac after each one. When you find the offending Control Panel or Extension, restart your Mac while holding the Shift key. Now locate the problem file and remove it from the System.

Mac Runs Slowly

Symptom: **Your Mac runs slowly.**

Explanation: The Carrera040 is set at the wrong speed setting.

Possible Cause:	**Remedy:**
The Carrera040 accelerator is set to '030 SLOW mode or is turned off	Open the Carrera040 Control Panel and make certain the Main Power switch is turned on. If it is not, turn it on and restart your Mac. Check the speed selector handlebar in the Carrera040 Control Panel and verify it is in '040 FAST mode.

System Errors and/or Application Lock-Ups

Symptom: **You experience System errors or lock-ups while running specific applications.**

Explanation: The applications most likely are incompatible in '040 mode.

Possible Cause:	**Remedy:**
Incompatible with the '040 processor	First try increasing the memory size for the problem applications in the Finder by clicking once on the application and selecting "Get Info". At the bottom of the Get Info window, you can enter a larger memory size. Next, open the Carrera040 Control Panel and add the problem application to the AUTO speed selector list and set its speed to *Med.* You should also contact the software developer to find out what version of their application is compatible with 68040 based machines such as the Macintosh Quadra and Centris, including the copy-back cache.

Sound Distortions

Symptom: **You experience sound distortions in your Macintosh IIci or IIsi.**

Explanation: System software incompatibilities with the Carrera040 software.

Possible Cause:	**Remedy:**
Older version of Sound Manager software incompatible with the '040 processor	Install the version of Sound Manager available on the Carrera040 Utilities disk into the System folder on the hard disk.

How to Install a "Temporary System"

Use this procedure to isolate software Extensions or Control Panel devices that do not appear to work together with the Carrera040 accelerator.

1. Boot your Mac with the Carrera040 Start-up disk that is provided with the Carrera040 accelerator.

2. Open the hard disk and locate the System folder as shown in Figure B-1.

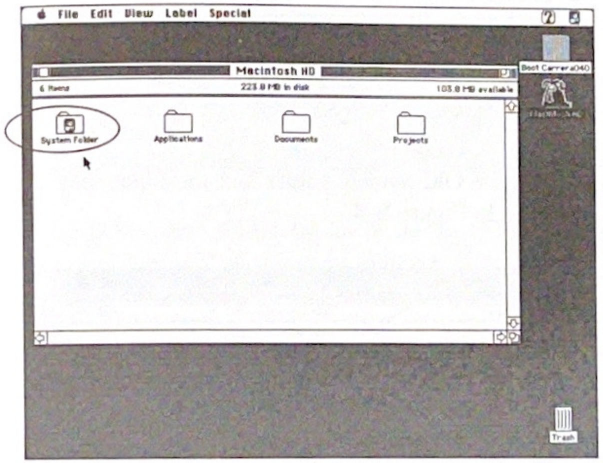
File
Edit
View
Label
Special
Macintosh HD
6 items
223.8 MB in disk
103.8 MB available
System Folder
Applications
Documents
Projects
Boot Carrera040
Trash

Figure B-1:
Locating the System folder

3. Click on the System folder to rename it. An "I" beam cursor will be placed at the beginning of the name of the folder as shown in Figure B-2. Now rename the System folder to Old System folder.

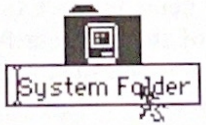
System Folder

Figure B-2:
Renaming the System folder to Old System folder

Disabling the Old System Folder

4. Open the Old System folder, locate the Finder and drag it onto the hard disk icon as shown in Figure B-3. This will place the Finder in the same window as the Old System folder.

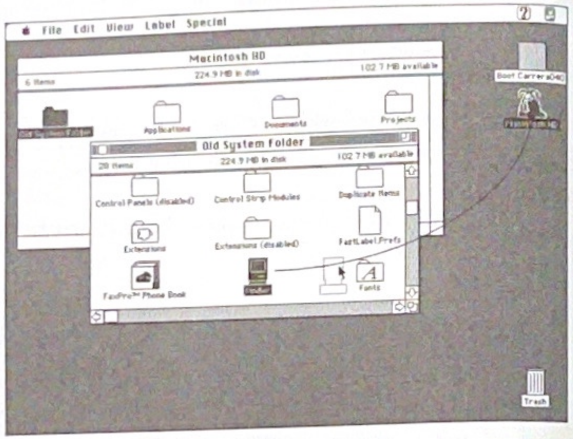
File Edit View Label Special
Macintosh HD
Old System Folder
Applications
Documents
Projects
Control Panels (disabled)
Control Strip Modules
Duplicate Items
Extensions
Extensions (disabled)
FastLabel Prefs
FaxPro Phone Book
Finder
Fonts
Boot Carrera040
Trash

Figure B-3: *Removing the Finder from the Old System folder*

Keep the Old System folder and the Finder together as shown in Figure B-4.

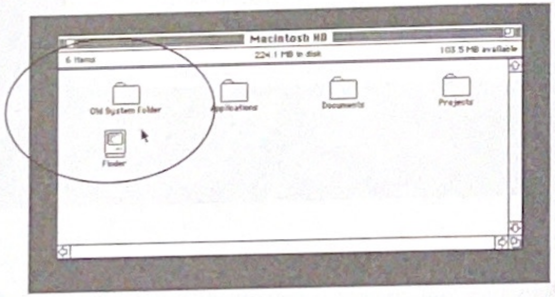
Macintosh HD
Old System Folder
Applications
Documents
Projects
Finder

Figure B-4: *Finder located outside of Old System folder*

Installing a "Temporary System"

5. Copy the System folder from the Carrera040 Start-up disk to the hard disk as shown in Figure B-5. This procedure places a minimum System folder on the hard disk. The only items in the Extension and Control Panel folders of this System folder are the ones necessary to boot the Mac with the Carrera040 accelerator enabled.

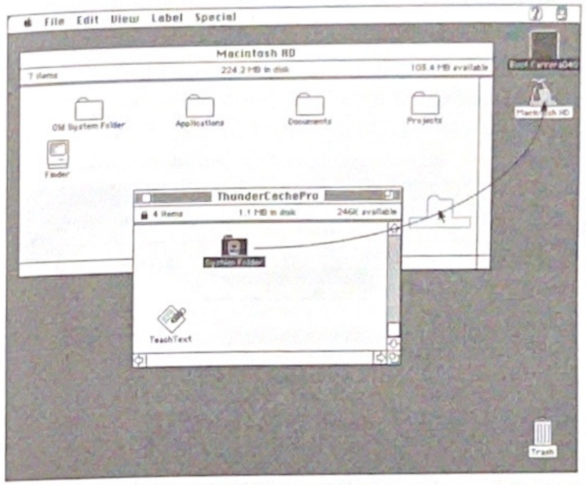
File Edit View Label Special
Macintosh HD
Old System Folder
Applications
Documents
Projects
Finder
ThunderCachePro
System Folder
TeachText
Boot Carrera040
Macintosh HD
Trash

Figure B-5: *Copying the System folder from the MicroMac Start-up disk to the hard disk*

After the System folder copies to the hard disk, verify that it is "blessed" as shown in Figure B-6.

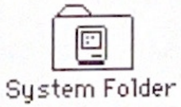
System Folder

Figure B-6: *"Blessed" System folder*

If the folder is not "blessed", open and close it one or two times. If the folder is still not "blessed", it is most likely due to another System folder being on the hard disk. You will need to locate and disable this second System folder by opening the folder, locating the Finder and removing it from the folder as shown in Figure B-7.

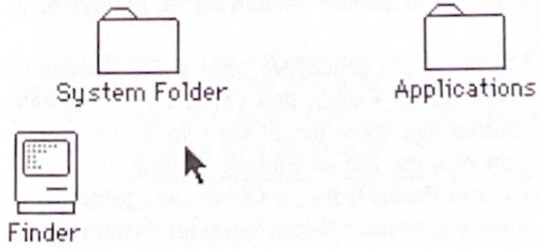
System Folder
Applications
Finder

Figure B-7: *Finder removed from System folder*

If the System folder is "blessed" then restart your Mac by selecting **Restart** from the **Special** menu as shown in Figure B-8 to verify that the Carrera040 accelerator loads correctly.

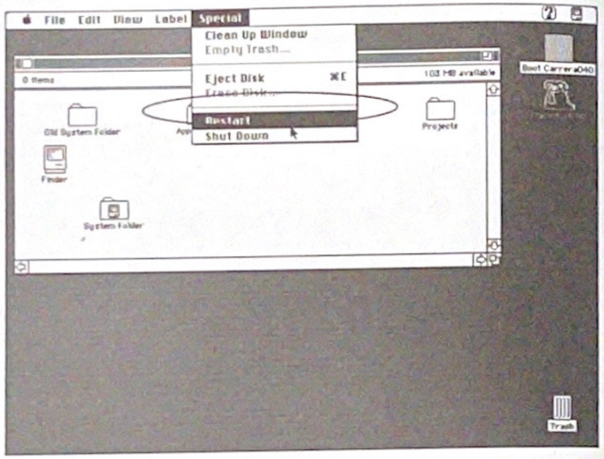
File Edit View Label Special
Clean Up Window
Empty Trash…
Eject Disk ⌘E
Erase Disk…
Restart
Shut Down
Old System Folder
Finder
System Folder
Projects
Boot Carrera040
Trash

Figure B-8:
Selecting Restart from the Special menu

Isolating Extension (INIT) and Control Panel Conflicts

6. Duplicate any prior activities that created errors or lock-ups to see if they still occur. If everything appears to function correctly, move more Extension and/or Control Panels from the Old System folder to the new System folder and select **Restart** again.

7. After the Mac reboots, move any suspected or questionable Extensions (INITs) and Control Panels from the Old System folder into the new System folder and select **Restart**. After the Mac reboots, verify the compatibility of these files. If they do not work correctly in the new System folder, remove them.

8. Continue this procedure until the Extensions (INITs) and Control Panels that cause System problems are located and taken out of the Old System folder. After you remove the offending Extensions (INITs) and Control Panels from the Old System folder, you need to update or remove them from your System.

9. If all the Extension and Control Panels from the Old System folder are moved to the new System folder and no problems are encountered, the error is in the Old System folder. Move any software related items still left in the Old System folder (such as sounds or fonts that may be installed in the System suitcase) into the new System folder and put the Old System folder and Finder into the trash as shown in Figure B-9. Empty the trash by selecting **Empty** from the **Special** menu.

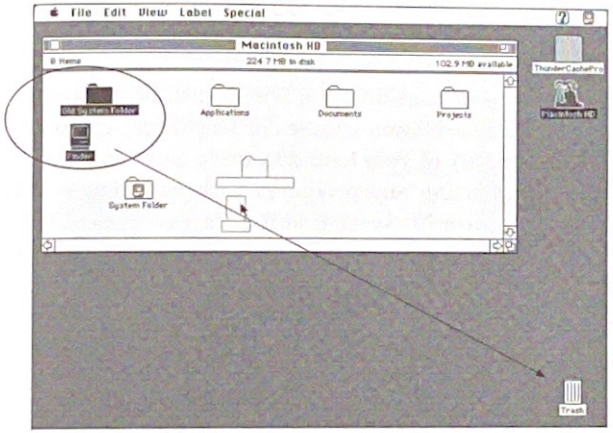
File Edit View Label Special
Macintosh HD
Old System Folder
Finder
System Folder
Applications
Documents
Projects
ThunderCachePro
Macintosh HD
Trash

Figure B-9:
Moving the Old System folder and Finder to the Trash

Installing a New System ("Clean System")

10. Now that you have isolated and removed the problem files from your System, a New System needs to be installed on the hard disk. If the System is 7.5 follow the "Clean Install" procedure on page B-6. If the System software version is lower than 7.5 use your System software install disks and install the System software into the existing System folder on the hard disk.

Note: For compatibility with MicroMac accelerators, please install System 7.5 as a "Clean Install". Do not update an older System folder with System 7.5.

How to Install a "Clean System"

Reinstalling System software with a "Clean System" is usually the best way to free the System from any bugs or corruptions that may have occurred to your System over a period of time. However, there is a major distinction between reinstalling the System software and actually installing a "Clean System".

When a System is reinstalled, the existing System file is updated, not replaced. Updating System software does not usually correct the System resource files that may have become corrupted. The only way to correct this problem is to do an actual "Clean System" install described as follows:

1. Check your start-up drive with a disk drive diagnostic tool such as Norton Utilities or Disk First Aid to verify the integrity of your hard disk drive and to make sure it is not causing any problems with your System. The installation of System software involves reading, writing and deleting files to the hard disk as well as rewriting boot blocks. If your hard disk drive passes the diagnostic tests with no problems, proceed with installing a "Clean System" using the System software disks that came with your Mac.

2. Restart your Mac using the System 7 Disk Tools disk. After the Mac boots, locate the System folder on the hard disk. The folder should appear "blessed" with a picture of the Finder on it as shown in Figure B-10.

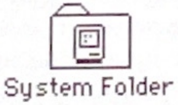
System Folder

Figure B-10:
"Blessed" System folder

3. Click on the System folder to rename it. An "I" beam cursor will be placed at the beginning of the name of the folder as shown in Figure B-11. Now rename the System folder to Old System folder.

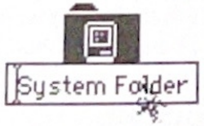
System Folder

Figure B-11:
Renaming the System folder to Old System folder

Disabling the Old System Folder

4. Before installing a "Clean System", you need to disable the System folder by removing the Finder. To do this procedure, open the System folder by double-clicking on it, locate the Finder and drag it to the trash as shown in Figure B-12. Empty the trash by selecting **Empty** from the **Special** menu.

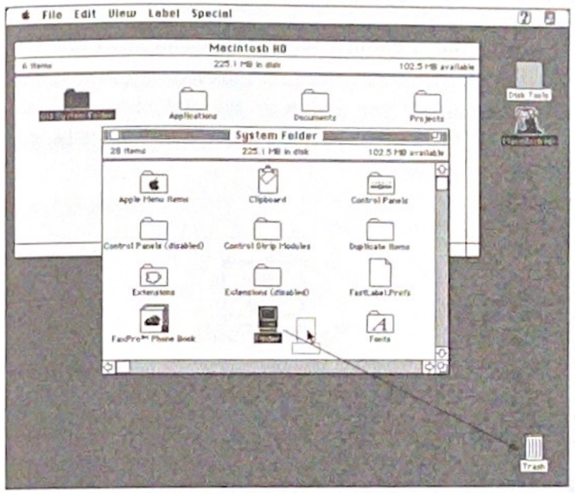
File
Edit
View
Label
Special
Macintosh HD
6 items
225.1 MB in disk
102.5 MB available
Old System Folder
Applications
Documents
Projects
Disk Tools
System Folder
28 items
225.1 MB in disk
102.5 MB available
Apple Menu Items
Clipboard
Control Panels
Control Panels (disabled)
Control Strip Modules
Duplicate Items
Extensions
Extensions (disabled)
FastLabel.Prefs
FaxPro™ Phone Book
Finder
Fonts
Trash

Figure B-12:
Locating the Finder and dragging it to the Trash

5. The disabled System folder should appear as shown in Figure B-13.

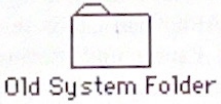
Old System Folder

Figure B-13:
Disabled System folder

Appendix B

6. Shut down your Mac.

7. You are now ready to perform a "Clean System" install. Place the first System software installation disk into the floppy disk drive and boot your Mac from it.

Installing a "Clean System"

8. You will be presented with two System software installation options: (1) Easy Install which places the particular files needed by your Mac in a new System folder and (2) Customize which allows you to add or remove features that you need, such as networking options, printer drivers and various System files. For the "Clean Install" that you are about to perform, select Easy Install.

9. After the System software is installed onto the hard disk, restart your Mac and make sure it boots correctly. You should see a newly created "blessed" System folder (as shown in Figure B-14) located in the hard disk window.

System Folder

Figure B-14:
Newly created "blessed" System folder

Installing Carrera040 Software

10. Install the necessary Carrera040 software at this time.

11. Restart your Mac by selecting **Restart** from the **Special** menu. After the Mac boots, test the operation of the System by performing various System functions such as formatting disks and launching programs.

Moving System Files into the System Folder

12. If everything is running smoothly, return to the Old System folder and move all your application-specific folders (such as Aldus and Claris folders), Extensions (INITs), Control Panels and preference files to the newly created System folder. Do not replace a file in the newly created System folder with the same file from the Old System folder. It is recommended that you drag your start-up items, Extensions (INITs) and Control Panels to your new System folder in small groups and restart your Mac each time to make sure there are no conflicts you may have missed.

13. Before trashing the Old System folder, check to see that you have not missed any important files or documents. You will need to make sure that you copy over your fonts and sounds (as well as any fonts or sounds that may be installed in the System suitcase) from the Old System folder as well. If you are uncertain about trashing your Old System folder, back it up onto floppy disks in case you need to access it in the future.

14. If you are satisfied with what you have copied over to the newly created System folder, trash your Old System folder and restart your Mac.

15. You are done!

Glossary

Apple Menu	The menu indicated by the Apple symbol ( ) from which you choose desk accessories and items from the Apple Menu Folder.
Application	A program that performs a specific task such as graphics, word processing, database management or accounting.
Button	A push-button-like image in dialog boxes that activate certain commands.
Cache	Pronounced 'cash'. Memory that acts like RAM, but faster. The computer stores its most frequently used instructions in cache.
Control Panel	A small program that allows you to adjust the Mac's operating features (such as desktop patterns, speaker volume or networking options).
CPU	Central Processing Unit. The "brains" of the computer that does most of the intensive operating calculations.
Dialog Box	A box that contains a message informing or requesting for information.
Extension	A file that expands the Mac's System software capabilities.
FPU	Floating Point Unit. A chip that takes over many of the operations of SANE and retrieves instructions straight from an application rather than having the CPU do all the work.
Icon	A graphical representation of a file or an application on the screen.
INIT	A small patching program that adds additional features to your operating system.
KB	Kilobyte (1024 bytes). An amount of memory that can express a text line of 1024 characters, or roughly half a typed page.
MB	Megabyte (1,048,576 bytes). An amount of memory equal to 1024K, or roughly 175,000 typed words.
Menu	A list of commands that appear when you select a menu title with the mouse pointer. To select a command, you drag through the menu, highlight a command and release the mouse button.

Pop-Up Menu	A menu that appears when you press a displayed section.
PDS	Processor Direct Slot. An expansion slot available on some Macintosh computers, such as the IIsi, for add-on cards.
RAM	Random Access Memory. Expandable memory where the Mac's operating system and applications are stored during power on, but will be lost at shut down.
ROM	Read Only Memory. Non-erasable memory with the Mac's basic operating code (such as Quickdraw).
SANE	Standard Apple Numerical Environment. Software routines for numeric operations (=, -, *, /...). Many operations performed by SANE can be taken over by a FPU.
SCSI	Small Computer System Interface (pronounced 'skuzzy'). An industry-standard for a parallel bus interface.
SIMM	Single In-Line Memory Module. Memory add-ons to expand RAM.
Trash	An icon into which you put files to be deleted. You can also eject a disk by dragging it to the trash.
Window	An area that displays information (icons or files) on the desktop. You can move, resize, open and close a window as well as manipulate its contents while it is displayed.

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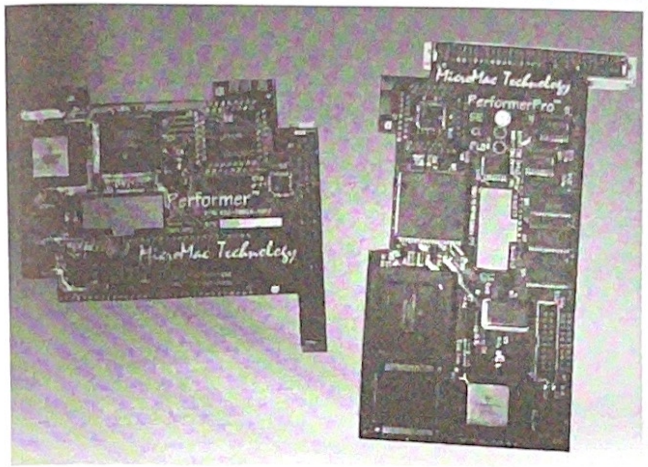
MicroMac Technology

MicroMac Performer & PerformerPro Accelerator



For the Plus SE & Classic:
The MicroMac Performer & PerformerPro Accelerator

Now the choice is yours! Upgrade your Plus, SE or Classic with the...

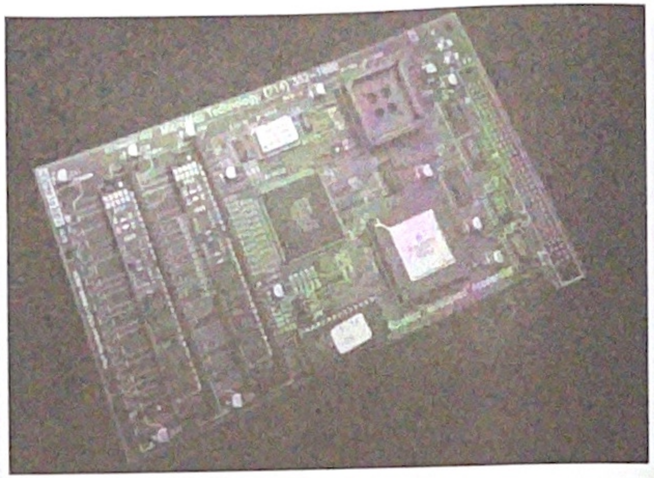
16MHz 68030 Performer accelerator and increase your Mac's speed by up to 300%.

Or choose the PerformerPro 32MHz 68030 with on-board 64K Cache and increase your Mac's speed by up to 600%.

For those using spreadsheets, graphics or music applications get the accelerator you have selected with the optional 25MHz 68882 FPU and speed mathematical calculations up by 800%.

Get up to 16MB of memory using Compact Virtual 3.0.1. By utilizing the 68030's PMMU (Paged Memory Management Unit) you can access of up to 16MB of RAM by mapping to your hard drive.

MicroMac MultiSpeed Accelerator



For the Plus, SE & Classic: The MicroMac MultiSpeed Accelerator

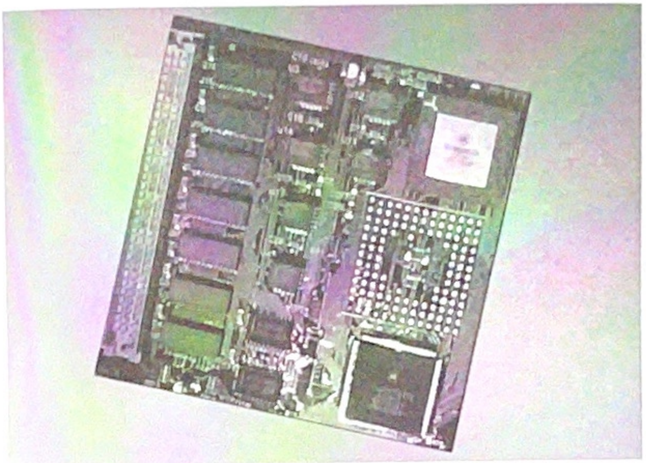
For Plus, SE & Classic users who need the speed of physical memory MicroMac introduces the MultiSpeed accelerator.

The MicroMac MultiSpeed accelerator combines the advantages of a powerful 68030 processor with a 32-bit wide data path to the on-board memory. Super fast performance is achieved by employing 60ns DRAMs in the four accelerator SIMM slots.

The MicroMac MultiSpeed accelerator comes in three versions 16MHz, 25MHz and 32MHz. The three speed versions will increase the CPU performance by more than 500%, 650% and 850% respectively.

Also, for the first time it is possible to use up to 16MB of physical memory (requires Compact Virtual 3.0.2) by utilizing both the logic board memory and the SIMMs on the MicroMac MultiSpeed accelerator. A Compact Mac with this accelerator is faster than a Mac IIci.

MicroMac Thunder & ThunderCache Accelerator



For the LC, LCII (Performa 400/405/410/430) & Color Classic: The MicroMac Thunder & ThunderCache Accelerator

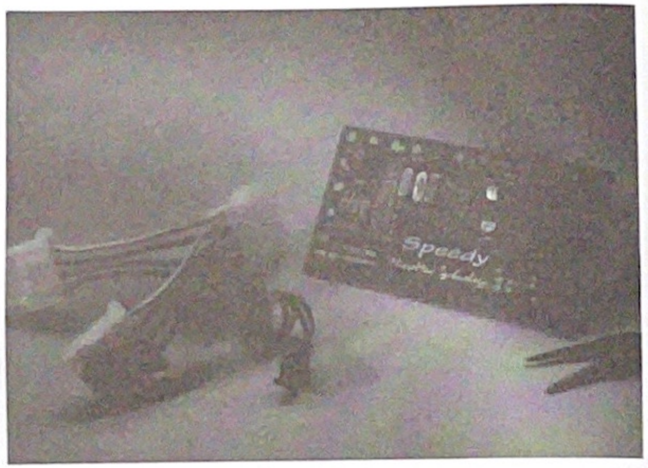
For the LC series and Color Classic Macintosh user MicroMac introduces the Thunder and ThunderCache accelerator. The choice is yours! Upgrade with the...

32MHz 68030 Thunder accelerator with a 16MHz 68881 FPU and increase your Mac's speed by up to 170% and math calculations by up to 400%. **OR** choose the 32MHz 68030 ThunderCache accelerator and increase your Mac's speed by up to 220%. The ThunderCache accelerator is available with an optional 32MHz 68882 FPU to speed up math calculations by up to 900%.

BREAK THE 10MB BARRIER and accelerate your LC series or Color Classic Macintosh with the ultimate version of the 68030 MicroMac Thunder and ThunderCache accelerator!

Now you can get the 32MHz ThunderPro or ThunderCachePro accelerators with 4 SIMM sockets on board. Load the sockets with four 1, 2 or 4MB SIMMs and break the 10MB barrier. **AND** for the ultimate in performance the ThunderCachePro is also available at 50MHz for a 350% speed increase. Both the ThunderPro and ThunderCachePro are available with an optional FPU.

MicroMac Speedy Accelerator

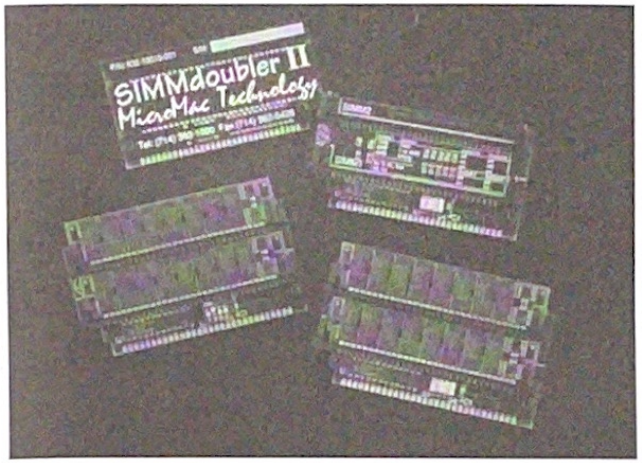


For the IIsi, IIfx, Centris 610/650, Quadra & PowerPC: The MicroMac Speedy Accelerator

For IIsi, IIfx, Centris 610/650, Quadra & PowerPC users MicroMac introduces the Speedy Variable Speed Clock Controller.

The MicroMac Speedy accelerator replaces the fixed frequency clock oscillator on your Macintosh logic board with a variable frequency oscillator (VFO). This hardware upgrade offers the best speed increase for a low investment. The increased speed, between 125% and 150% depending on the Mac you own, will allow you to perform routine tasks much faster. Today's new computer intensive graphical applications, as well as the new operating systems such as SYSTEM 7.5 require every bit of available computing power to run optimally. You are able to choose from a variety of frequencies. Select the desired frequency by dialing the frequency thumb wheel on the MicroMac Speedy accelerator. This feature allows you to fine tune the speed of your Mac to your particular hardware and software environment. The MicroMac Speedy accelerator comes with all the necessary connectors to fit the supported Macs, and best of all, no soldering is required!

MicroMac SIMMdoubler II



For the Mac II, IIx, IIcx, IIfx, IIci, IIsi, IIvi, IIvx & Performa 600: The MicroMac SIMMdoubler II

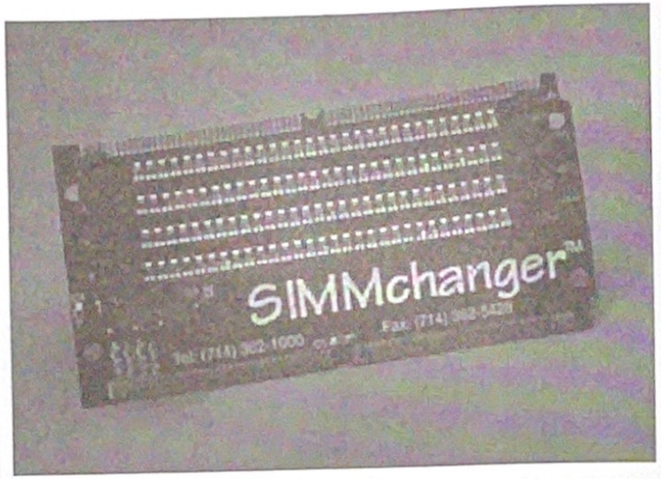
For Mac II, IIx, IIcx, IIfx, IIci, IIsi, IIvi, IIvx & Performa 600 users MicroMac introduces the SIMMdoubler II Memory Enhancer.

Each SIMMdoubler board plugs into one SIMM socket of your Mac logic board and provides two SIMM sockets. This effectively doubles your SIMM capacity and is the most cost effective solution to add physical memory to your existing DRAM.

SIMMdoubler Benefits:

- **Increase your memory up to 64MB**
  Works with standard 1MB, 2MB, 4MB SIMMS.
- **Reuse your existing SIMMs**
  The SIMMdoubler adds additional SIMM slots so you can use your existing memory.
- **Costly ROM exchange not required**
  Owners of the Mac II no longer need a ROM exchange to go beyond 8MB of memory.
- **Customize your memory configuration**
  The SIMMdoubler allows you to build 2MB, 3MB, 4MB, 5MB and 8MB SIMMs by combining 1MB, 2MB and 4MB SIMMs in various configurations.
- Easy 10-minute installation

MicroMac SIMMchanger



For the Mac LCIII, Quadra 605/610/650, Centris 610/650 & PowerPC 6100/7100 (no CD): The MicroMac SIMMchanger

For Mac LCIII, Quadra 605/610/650, Centris 610/650 and PowerPC 6100/7100 (no CD) users MicroMac introduces the SIMMchanger Memory Enhancer.

The MicroMac SIMMchanger converts your existing 8-bit 30-pin SIMMs into one 32-bit 72-pin SIMM for use in the new Mac Centris, Quadra and PowerPC models.

SIMMchanger Benefits:

- **Re-use your existing SIMMs**
  Save by converting SIMMs that you may have from your older Mac, for example, a Mac series computer or even from your first compact Mac.
- **Compatible with a wide range of Macintosh computers**
- **Easy 10-minute installation**
  As easy as adding SIMMs. Just populate the SIMMchanger with four 30-pin SIMMs, set the configuration jumpers and plug the SIMMchanger into the 72-pin SIMM socket of the logic board of your Mac or PowerPC. It's that easy!

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